August 1944

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Textiles as a Market for Chemicals page 218

Chemical Industries

The Chemical Business Magazine

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AUG 29 1944

3 STABLE FORMS OF HYDROXYLAMINE

Properties of Hydroxylammonium Salts

NAME	Hydroxylammonium acid sulfate	Hydroxylammonium sulfate	Hydroxylammonium chloride
FORMULA	$NH_2OH \cdot H_2SO_4$	$(NH_2OH)_2 \cdot H_2SO_4$	$NH_2OH \cdot HCL$
Molecular Weight	131.11	164.14	69.50
Approximate Specific Gravity	1.83	0.91	0.62
Melting Point, °C	Indefinite	162 d.	152 d.
pH of 0.1M Aqueous Solution at 25°C	1.6	3.5	3.4
Solubility—g/100g at 25°C			
In Water	390 Approx.	63.9	94.7
In Methanol	20.2	0.1	17.5
In Ethanol, 95%	4.3	0.2	10.5
In Ethanol, Absolute	6.3	0.1	6.6
In Butanol	2.2	0.03	0.6

*These Hydroxylammonium salts are only very slightly soluble in ethers, esters, and aliphatic or aromatic hydrocarbons.

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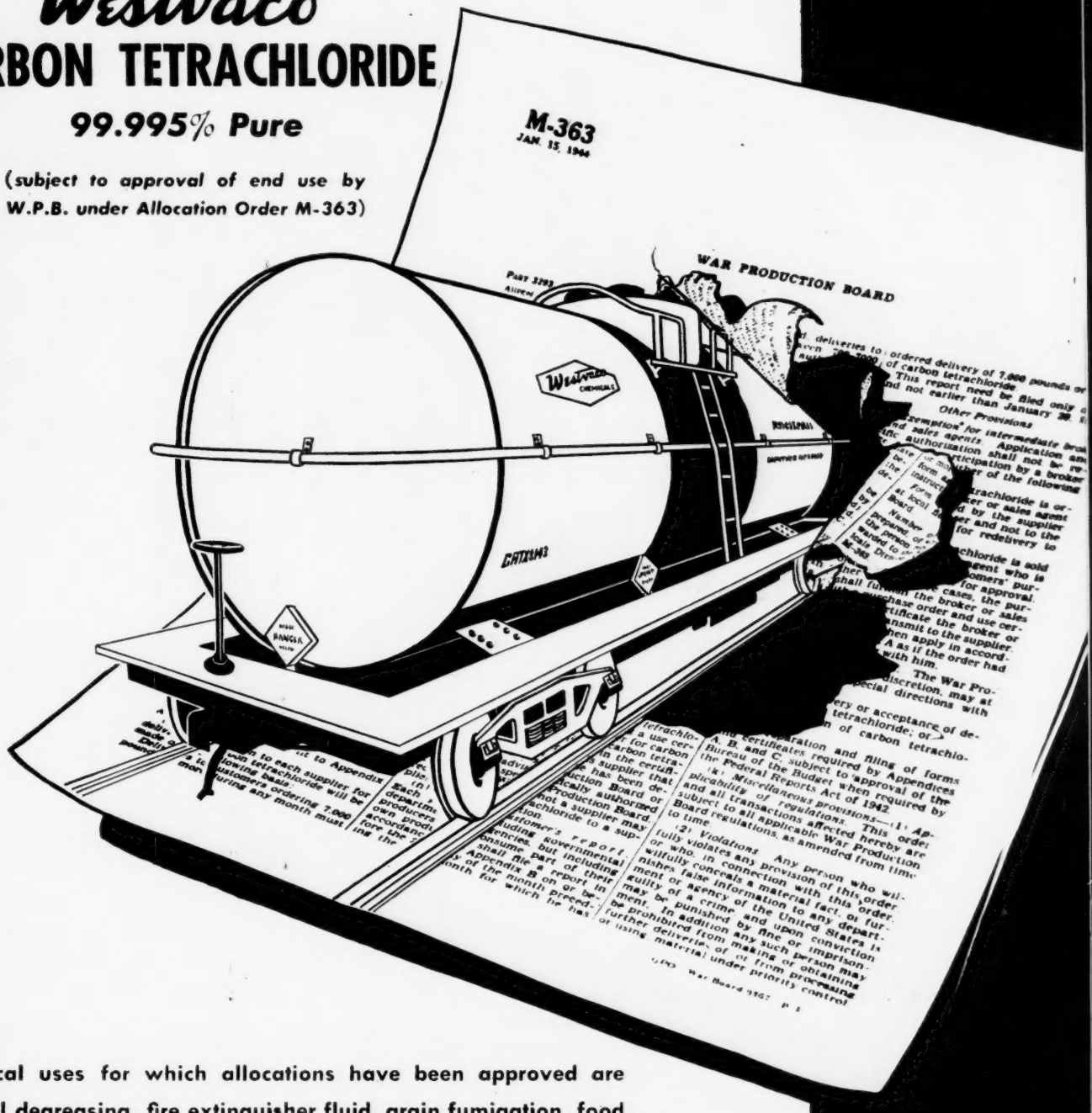

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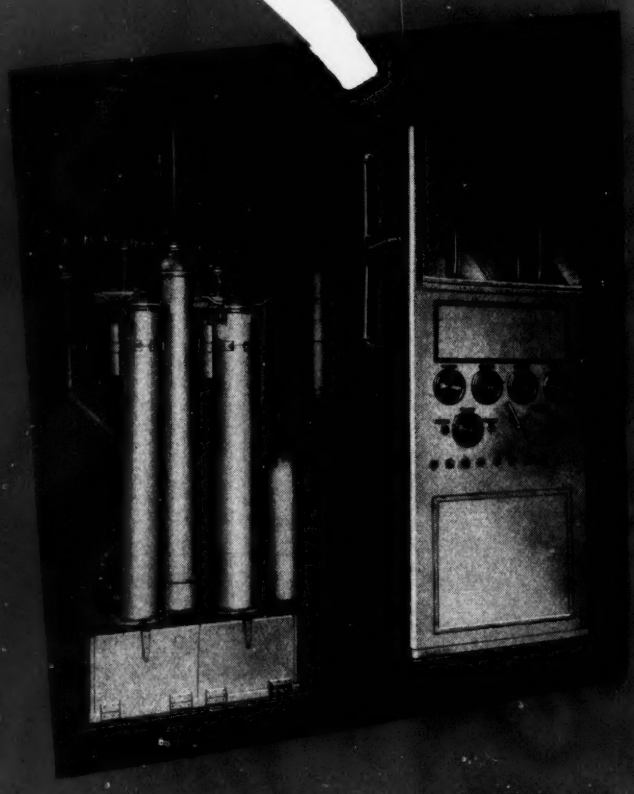

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Chemical Industries

THE BUSINESS MAGAZINE for MAKERS and USERS of CHEMICALS
Management • Research • Production • Marketing

VOL. 55—NO. 2

August, 1944

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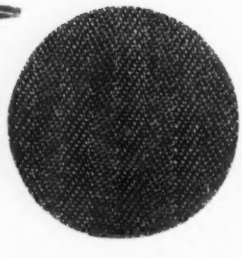

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THE READER WRITES

"New Chemicals for Industry"

To the Editor of Chemical Industries:

The Mallinckrodt Chemical Works will participate in the National Chemical Exposition to be held in Chicago this Fall, and is interested to know if you plan to continue your exhibit of "New Chemicals for Industry" at that time.

WALLACE M. KELLEY
Mallinckrodt Chemical Works,
St. Louis, Mo.

Yes, the CHEMICAL INDUSTRIES *"New Chemicals for Industry" exhibit will again be displayed at the National Chemical Exposition in Chicago, this time covering new commercial chemicals introduced during 1943 and 1944. The call for samples and descriptive data will go out very shortly, so if you anticipate any difficulty or delay in collecting your material it isn't too early to start. All samples must be submitted in standard* CHEMICAL INDUSTRIES *display bottles which will be furnished without charge.*—EDITORS.

Stockpiles for Insurance

To the Editor of Chemical Industries:

I read with considerable interest Dr. Keyes' article "Insurance Plants for the Chemical Industry" in your June issue. The main trouble with such a plan, as I see it, is in the prediction of what industries are actually going to be essential when the next war breaks out. As is unfortunately the case in most disasters it is the items which are missing at the time that make for the disaster itself. I myself, and a few others that I have talked with, believe that stockpiles of certain essential materials would be of more value than the plants to make them.

Another point with regard to chemical insurance plants is that the actual processes themselves are usually always to some degree in a state of change. For instance, an alcohol plant that we might design now would be perhaps in ten years quite obsolete from the point of view of operation costs. The same holds true for yields, production and quality.

I believe the emphasis should be placed on increased technical education and the so-called "know how." Perhaps there is some place for government to keep a check on this technical education and industrial progress. This perhaps could be done through agencies of the Army and Navy in placing sample orders for new types of equipment and supplies. I believe that one working model of a new type pursuit plane is worth more than a hangar full of obsolete equipment. Of course, we could not let ourselves run completely out of stocks of supplies, and for this reason I have previously mentioned the idea of stockpiles of certain essential materials.

Dr. Keyes states that lack of "know how" rather than lack of metals and actual material has caused the delay in the production of some of our synthetic organic materials. Actually I was under the impression that our "know how" and technical abilities were quite abreast of the times and that most of the delay had been caused through political wrangles and red tape. Once it was actually decided to launch our synthetic rubber program is it not true that the technical difficulties were worked out with amazing facility?

In closing I am certainly in accord with Dr. Keyes' suggestion that the chemists and engineers have more of a voice in planning our future industrial welfare. I hope that you may follow up this angle further in your publication.

L. P. WENZELL, *Chemical Engineer*
Monsanto Chemical Co.,
Monsanto, Ill.

(*For more comments on the "insurance plants" proposal, see page 214.*—EDITORS.)

Bibliography of Agriculture

To the Editor of Chemical Industries:

The Department of Agriculture has been publishing for the last twelve months a comprehensive bibliography on all the subjects related to agriculture. I was surprised that your magazine was not included in this bibliography as I know that you often carry material of vital importance on these subjects.

Enclosed is a copy of a letter which I sent to the Librarian of the Department of Agriculture.

I hope that this situation will be rectified at an early moment as I know that the Bibliography of Agriculture is being used extensively at the present time and constitutes a permanent record of all the publications in the field.

ROBERT S. ARIES, *Field Director*
Northeastern Wood Utilization Council
New Haven, Conn.

We appreciate Mr. Aries' suggestion on our behalf to the Department of Agriculture. While Chemical Industries is obviously not an agricultural journal, it has made a special effort to keep its readers informed of all outstanding commercial developments in the use of industrial crops as chemical raw materials.—EDITORS.

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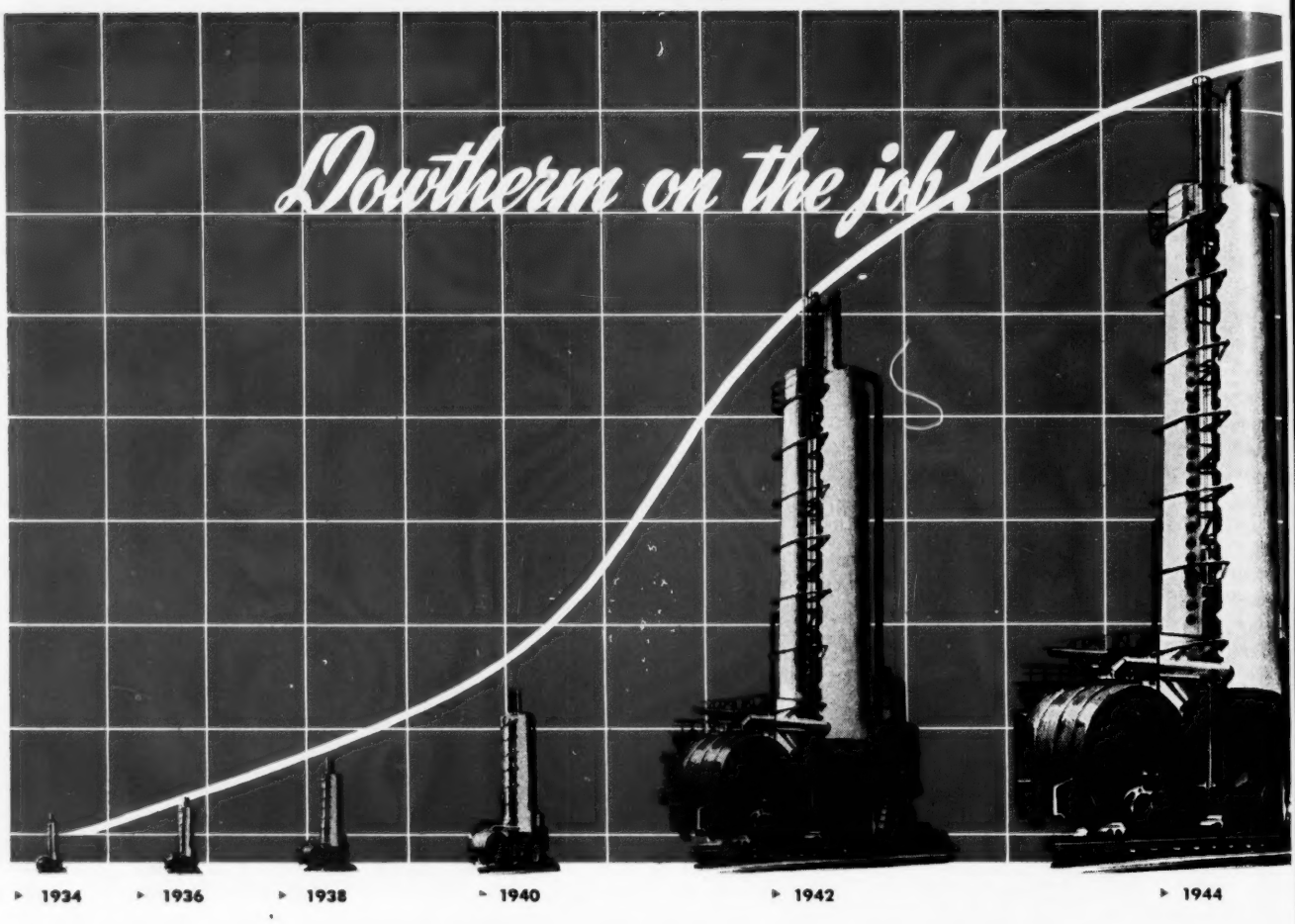

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WASHINGTON

T. N. SANDIFER *reporting*

Reconversion • Small Business • Surpluses Patents • Chemical Prices • Tax Refunds

Reconversion Gets Under Way

THE LEGISLATIVE HIATUS due to Congressional preoccupation with the election campaign shows signs of continuing as this is written. This means that it may be late Fall before any serious effort is shown by either House or Senate to get back on a regular schedule. Some very important legislation is on this schedule, however.

The Nelson program for gradual reconversion is under way, but subject to review. While the provision for a review ostensibly was a sop to die-hard opposition to extensive reconversion at this time, actually it may prove a medium for broadening the movement if the war situation at the time encourages any such effort.

This reconversion movement may therefore be well under way before Congress really gets back to work. There is a broad relationship between the move and Congressional sentiment, in that Congressional sentiment is generally believed here to be supporting the Nelson plan. Some of the opposition, on the other hand, was attributed in part to a fear that some industries, and some elements within industries, might be given an advantage in the start toward normal activity again, and in this respect the opposition may find itself bucking a powerful Congressional development, namely pending legislation to aid smaller business.

Congress and Small Business

LEGISLATION IN BEHALF OF SMALL BUSINESS is on the books for early action after the present recess. While this page was guilty some time ago of repeating a rather facetious definition of such businesses that was current here then, the Senate Small Business Committee takes a much broader view of the term, and has pointed out that the definition of what is a small business may be only relative. In short, a big business may be small by the side of an international corporation, but not necessarily so in its own right.

The committee has manifested concern over a recent finding of the Department of Commerce that the total number of business enterprises has declined by more than one-half million since 1940. It points out the indicated trend toward concentration may be reversed during the conversion period, and a study of various recommendations for legislation under heading of "small business" points to an effort to stimulate such a reversal.

Some recommendations by the Senate Small Business Committee may be pertinent here:

An amendment to Public Law 603 to broaden the scope of the Smaller War Plants Corporation by making it independent of War Production Board;

The Corporation to be given independent representation on all major Government committees dealing with reconversion problems;

Small business (see Congressional interpretation of the term) should be given an early opportunity to convert and be assured of adequate materials from stocks not needed for war production;

And these recommendations, some of which are already to be found embodied in one or more bills now pending:

Steps to grant smaller concerns non-exclusive licenses for use of Government-owned patents, including some 45,000 patents owned by enemy aliens which have been seized by the Government;

That the Small Business Corporation be empowered to complete arrangements for smaller concerns to make use of research and technical assistance available through Federal, State, and local governments; in this connection, a number of bills will be recalled as pending, providing for greatly enhanced Government controls over patents, greatly expanded Government research organization, etc.

The committee points out that in the industrial use of war-stimulated developments—electronics, power metallurgy, magnesium production—"government policy with respect to the scientific developments which it controls will be a decisive factor" in settlement of whether "a few large corporations" or smaller concerns, will reap the benefit.

A "healthy industrialization of the West and South" also is urged.

The committee also has under consideration a provision to authorize the Smaller War Plants Corporation to buy surpluses for resale to smaller concerns where such purchase "is necessary to preserve and strengthen the competitive position of small business."

These various ideas and recommendations culled from Congressional sources and thinking are set forth in some detail, because they are expected to bulk large

in the reconversion situation when it assumes more importance than at present.

Surplus Property Disposal

HERE IS ANOTHER FIELD for pending legislaiton. More than a million different types of items are said to comprise the Government-owned stocks that are or will become surplus. Among these are some $16,500,000,000 of industrial plants and equipment, and surplus civilian-type products totaling several billions, in this country.

Legislative suggestions now under consideration provide:

Full public access to records of inventories and sales by Government agencies; full publicity on materials available by Surplus Property Administration, and liberal intervals between notice of materials available and actual sales; and sales in suitably small lots where necessary to accommodate the smaller purchaser.

With reference to surplus chemicals and chemical materials, the Surplus Property Administration has informed the writer that it is planned to notify WPB of these, with a view to permitting immediate reallocation where necessary, in the cases of material under allocation, and to maintain contact with the other interested agencies both as to surpluses available, and those which may become so.

So far as can be learned, the WPB Chemicals Bureau has not been drawn into the situation on surpluses on a formal basis. There was a report that Surplus Property Administration might establish its own technical consulting unit, but this has not been done as yet. In fact the Surplus Administration is necessarily a new organization and doubtless only the beginning of what it will be later under full swing.

For the time at least, the Surplus division of the Treasury Procurement Office will dispose of small packaged drugs and chemicals, with bulk items handled by the Surplus Property Administration.

Chemical Price Statistics

SOME MEMBERS OF THE CHEMICAL INDUSTRY are aroused over publication of wholesale price indexes by the Department of Labor, which these members feel do not give a fair picture of such prices.

On their face some of the statistics from official agencies would give the impression, so the complaint runs, that chemical prices are far out of line. This impression can cause some obvious complications, in wage matters and in price situations.

The error is said to lie in the failure to take into consideration such factors as the Federal taxes on ethyl alcohol, for example, which are reflected in the price of a great many products in which ethyl alcohol is used.

A current report by the Manufacturing Chemists' Association shows that for drugs and pharmaceuticals, for illustration, the wholesale price index of 220.1 reported for May (1926 = 100), can be attributed in large part to additional Federal taxes on ethyl alcohol. These taxes have risen from $2.20 per gallon of 100 percent alcohol in 1933 to $18.00 in 1944.

Import Prices

TAKING COGNIZANCE OF THE RECENT ACTION of the War Shipping Administration in getting out of the insurance field on certain commodities, among them tanning materials, vegetable waxes, beeswax, natural resins, crude and finished tar acids other than cresylic, and hide glue, the Office of Price Administration has revised its regulation on these items.

Recognizing that many private insurance companies will insure cargoes on a basis considerably higher than their value as measured by the price paid by the importer, OPA has now limited the amount the importer or other seller can include in his price as coverage of such insurance costs. The change allows price adjustment on the basis of actual premium at current commerical rates, for an amount of insurance equal to the risk formerly insured by WSA, namely 105 percent of actual out-of-pocket cost.

Fertilizer Regulation Consolidated

IN AN EFFORT TO REDUCE the number of regulations under which the fertilizer industry must operate and further simplify price controls, OPA has incorporated regulations governing prices to consumers for nitrogenous fertilizer materials in RMPR 135, and revoked the old regulation, RMPR 108, effective from August 1.

Patent Decision

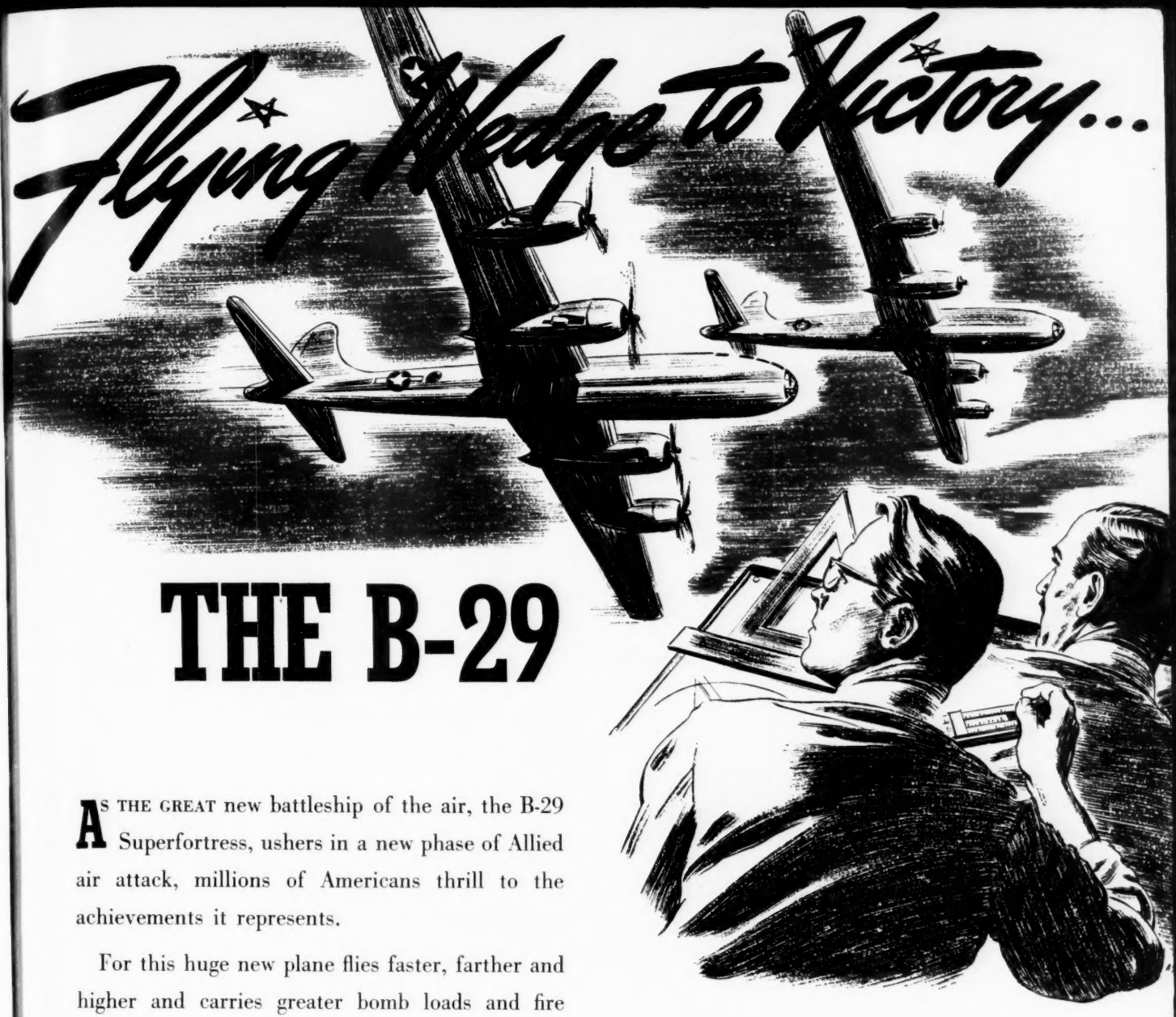
SOME UNEASINESS is reflected here over a new doctrine evident in court decisions on patents, typified by the line taken by Supreme Court Justice Douglas that inventions, to be entitled to public protection of patents, must be in effect "a flash of genius" rather than the product of "the skill of the calling" or as widely interpreted, the result of organized research and investigation.

The implications are considered to be very broad, and holding rather unforeseeable difficulties for post-war business practices based on the accepted view of patent rights.

Such a doctrine, coupled with pending legislation on patents such as that which would restrict the use of a patent under certain interpretations of anti-trust activity (Voorhis bill and possibly others) suggests new conditions surrounding patent administration in the postwar period.

Tax Refunds

TAX REFUNDS ARE EXPECTED to rise to a level of about a billion and a half dollars in 1945, contrasted with the rate in 1939 of $67,900,000; included in the 1945 total will be bonds issued now for corporate profits taxes refundable after the war .



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Wide Compatibility	Does Not Decompose to Acrolein	Assimilability

Arlex: Reg. U. S. Pat. Off.

ATLAS INDUSTRIAL CHEMICALS DEPARTMENT

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

BAKER PLASTICIZERS

are designed especially for the following resins:

1. Vinyl Resins
2. Phenolic Resins
3. Alkyd Resins
4. Cellulose Resins
5. Acrylic Resins
6. Styrene Resins
7. Urea Formaldehyde Resins
8. Melamine Resins

Baker Plasticizers Contain No Phthalate

THE BAKER CASTOR OIL COMPANY

Established 1857

120 Broadway, New York 5, New York

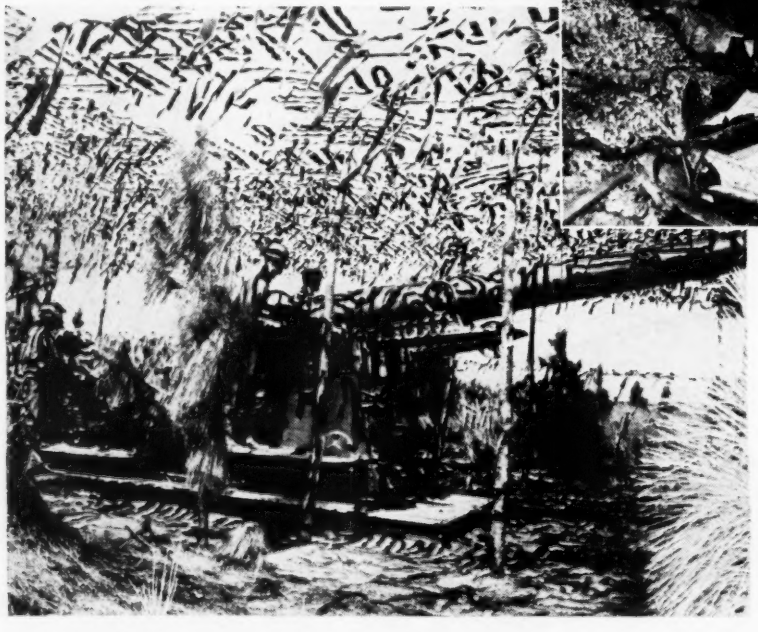
Jersey City, New Jersey

Los Angeles, California

Bayonne, New Jersey

Life ON THE

(*Right*) **LOOK CLOSELY** and you will see *Rana pipiens*, better known as the leopard frog, which nature has made scarcely discernible against the rustic background through clever color camouflage. This demonstrates perfectly the ultimate aim in man-made camouflage, for the frog has hidden himself in plain sight by color resemblance to his background. The effect is achieved with both disruptive color patterns and obliterative shading. Similar results are being accomplished today by camouflage experts in concealing military equipment, vital installations, whole communities, as well as the individual soldier, with uniforms which conform to the colors of the battlegrounds. The use of the "shrimp net" shown below is a typical example of expert military camouflage of equipment.



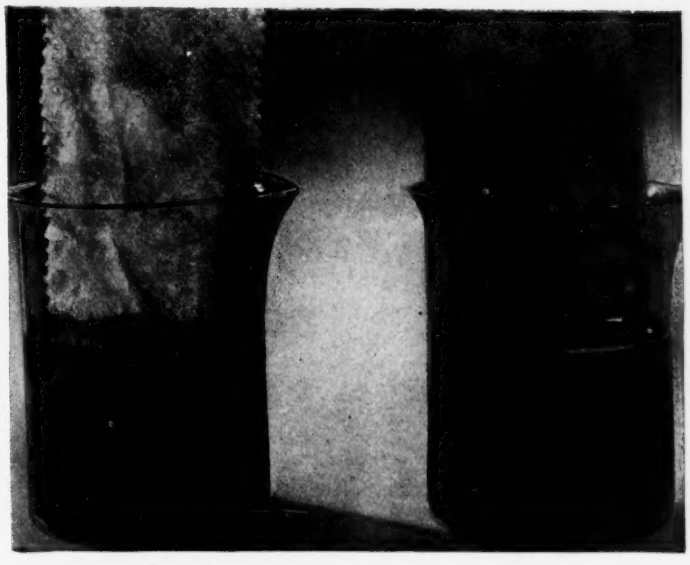
(*Left*) **HERE IS A CAMOUFLAGED HOWITZER,** the largest mobile field piece in the army. It is effectively concealed with a "shrimp net" impregnated with colored resin emulsions of the type developed by the Calco Chemical Division of American Cyanamid Company. Nets treated with these emulsions, thrown over objects, render them indistinguishable to the human eye from a distance. They are also proof against photography since their tone values and infrared reflectance exactly match those of the backgrounds on which they are used. Moreover, these Calco emulsions are water-miscible to reduce the fire hazard during processing, and include both mildew and flame-proofing agents to speed up and simplify their use. This multiple achievement was made possible by Calco's long and varied experience as one of America's leading manufacturers of dyes and organic chemicals and by the extensive research facilities of American Cyanamid.

(*Left*) **A "HALF-TRAC" HAS ROUGH DUTY** as it plows through mud and water doing scout duty in front of tanks. Surface coatings for these "half-tracs," tanks, trucks, guns, jeeps, and other mobile equipment of the Army must conform to government specifications to supply the utmost in protection against exposure to the elements and the deteriorating effects of other varied and tough conditions of service.

Many synthetic resin vehicles such as REZYL*, TEGLAC*, BEETLE*, MELMAC* and PHENAC** developed by Cyanamid, are helping the paint industry to meet exacting government specifications for surface coatings that can stand up and take it under all types of service conditions on land, at sea and in the air. The "proving ground" of effective wartime use for Cyanamid's synthetic resin vehicles will provide new advantages in surface coating developments for many types of civilian goods applications in the future. Full details on the properties and characteristics of Cyanamid synthetic resin vehicles are covered in special technical bulletins issued by Cyanamid. These may be obtained upon request.

CHEMICAL NEWSFRONT

(Right) **SAVING TIME** by improved wetting, emulsifying and dispersing operations in textile processing is one of many timely uses for DECERESOL* OT, a special "surface-active" material developed in the Cyanamid laboratories. Known as "the most powerful wetting agent available," DECERESOL OT has, for example, excellent dye leveling properties as shown in this illustration of actual tests. "Grey" cotton fabric (left) dyes unevenly by ordinary methods. However, a dye solution containing 0.05% DECERESOL OT 100% (right) produces the sought after uniform level dyeing results. Among other uses for DECERESOL OT are as a penetrant in all types of dyeing including yarn, knitted and woven goods...as a dispersing agent in dyestuff mixtures to insure better solubility and color value...for the production of highly absorbent products such as mop yarns, paper mill felts, towels and similar fabrics...as a dispersing agent for finishing oils to obtain a greater softening value...for boiling off rayons and acetates...and for dyeing nylon and vinyon yarns, etc. Full, detailed information on the many and varied advantages of DECERESOL OT in textile processing may be obtained by writing Cyanamid. Other important fields of use for DECERESOL OT include the metal-working and leather industries.



(Below) **NUMBER ONE PEST** in the animal life of the Australian continent, and a constant threat to pastoral and agricultural industry are the descendants of a few rabbits brought to Australia about one hundred and fifty years ago. Rabbit control in Australia, however is being mastered by use of CYANOGAS A-DUST*, extensively used there also for destroying citrus fruit scale. The fumigant, shown being blown into a rabbit warren with a modern foot pump duster, penetrates the network of burrows to destroy the rabbits which are such a constant menace to pastoral and agricultural industries. CYANOGAS A-DUST is universally used as a pest destroyer, as well as proving to be the most economical and effective answer to the Australian rabbit problem. Shown here is a typical rabbit warren being blown with a modern foot pump duster at Coonabarabran, New South Wales.

(Below) **AN ALMOST UNLIMITED RANGE** of stable opaque and translucent colors can be produced in Cyanamid's BEETLE plastic molding material. Batches of resin, blended with dyes and pigments, are shown being tested for exact color results in Cyanamid's Color Control Laboratory at Bound Brook, N. J. BEETLE, the plastic that is "all color in all colors," will again be available in thousands of colors for use in industrial design, as a sales stimulant, and for packaging appeal and display value. The Plastics Division at Cyanamid is prepared to assist with experienced counsel in the effective use of plastics in product development.

*Reg. U. S. Pat. Off. **Trade-Mark

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.

DIAMOND ALKALIES
...Guard America's Fighting Air Forces...
When a thousand—or two thousand—Allied Planes roar over enemy territory, many Diamond products contribute their bit to the success of the missions.
For example, a huge tonnage of Diamond Soda Ash goes into the production of aluminum for airplane construction. To make high octane gasoline, refiners use a fluid catalyst made by a process involving the use of Silicate of Soda—a Diamond product. Plastic control knobs and other parts serve many vital functions in the modern airplane—and here Diamond Chlorine appears as a material used in the manufacture of vinyl plastic. Similarly, Diamond Chlorine helps make ethylene glycol that cools the engines. And in producing explosives in the ...Diamond Soda Ash plays an important part.
...Diamond Products help hasten the day when ...ery will permit their use for the production of peace-...goods.
DIAMOND ALKALI CO. PITTSBURGH

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DIAMOND ALKALI CO. PITTSBURGH

It pays to be a Bemis Multiwall paper bag Customer

EVEN though direct government purchases have taken a considerable part of our multiwall paper bag production this year, Bemis customers have not suffered . . . they have been supplied on the basis of past purchases, even in the face of the labor shortage and no increase in facilities.

Naturally, the demand for Multiwalls has been greater than the supply. Much as we regret inability to fill all orders, we have felt a responsibility to take care of our regular customers first. Fortunately, we've been able to do that—and right on schedule. If it's humanly possible, we'll keep on maintaining this service.

War or peace, we want our customers to feel that it pays to be Bemis customers.

NORTH
WEST EAST
SOUTH

A major reason we've been able to supply our Multiwall customers is the size and flexibility of our production facilities.

Bemis Multiwall Plants at

PEORIA, ILL.
EAST PEPPERELL, MASS.
MOBILE, ALA.
SAN FRANCISCO, CALIF.
WILMINGTON, CALIF.
ST. HELENS, ORE.

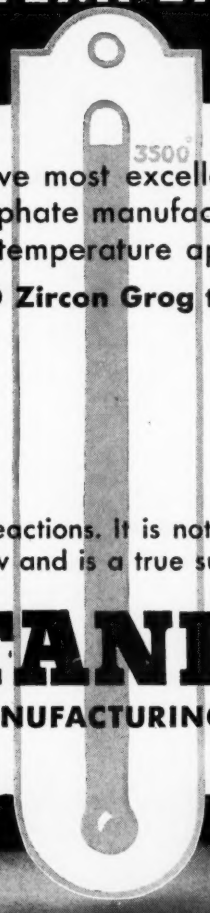
These plants not only give us large production, but also quick accessibility to all parts of the country.

BEMIS BRO. BAG CO.

Baltimore • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Denver
Detroit • Houston • Indianapolis • Kansas City • Los Angeles • Louisville
Memphis • Minneapolis • New Orleans • New York City • Norfolk • Oklahoma City • Omaha • St. Louis • Salina • Salt Lake City • Seattle • Wichita

East Pepperell, Mass.

TAM ZIRCON REFRACTORIES
FOR HIGH TEMPERATURE USES



TAMCO Zircon Refractories give most excellent results in industries such as Aluminum remelting, metaphosphate manufacture, platinum and special alloy melting, high temperature applications, etc.

The properties of TAMCO Zircon Grog type bricks are as follows:

P. C. E. . . . . .Above cone 42

Safe Operating Limits . . . . .Up to 3500° F.

Thermal Spalling. . . . . .13 cycles
(air blast 10 minutes on 10 minutes off at 2500° F.)

Cold Modulus. . . . . 2000 lbs. sq. in.

Hot Modulus @ 2200° F. . . . .186 lbs. sq. in.

Apparent porosity . . . 24 hours soak—14.7%
5 hours boil—18.0%

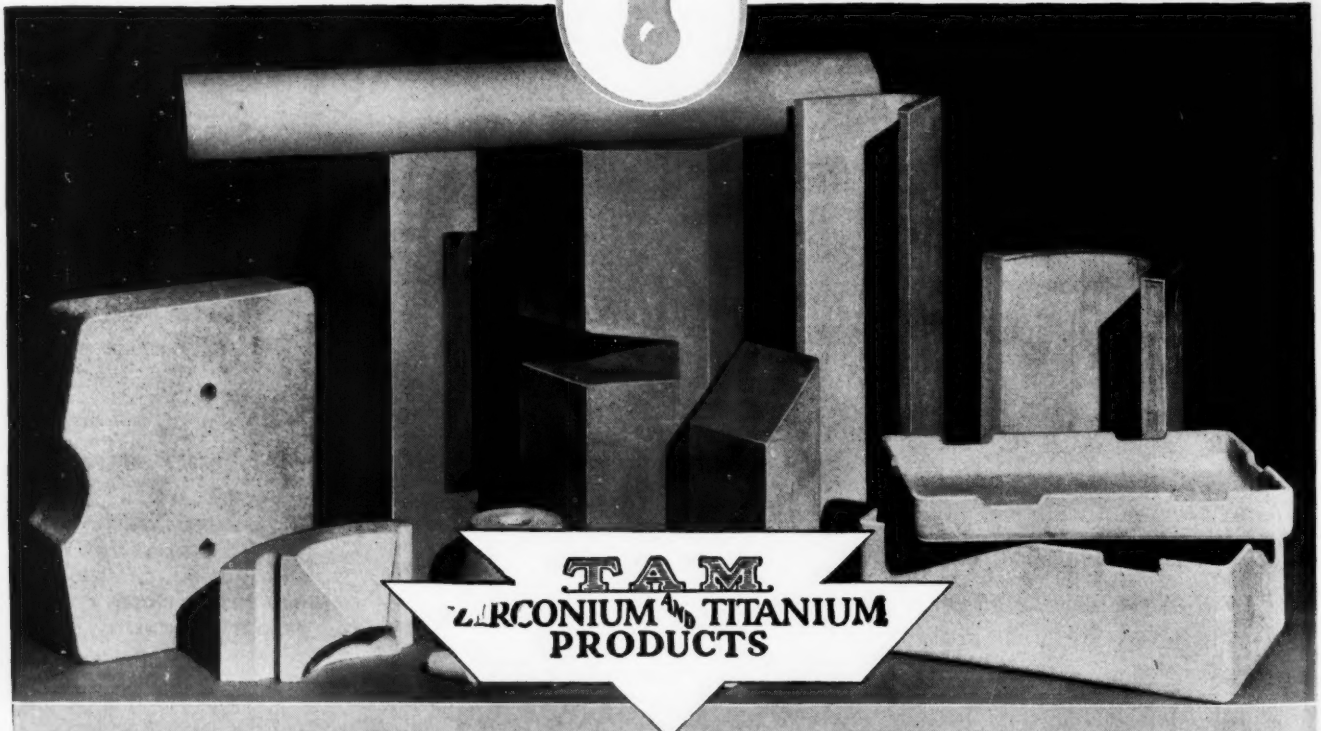
Thermal Conductivity . . . . . .
0.005 gm. cal. in G. G. S. system

Deformation under load . . .25 lbs. per sq. in.
2750° F.—2.72%

Specific gravity . . . . . Bulk 3.13

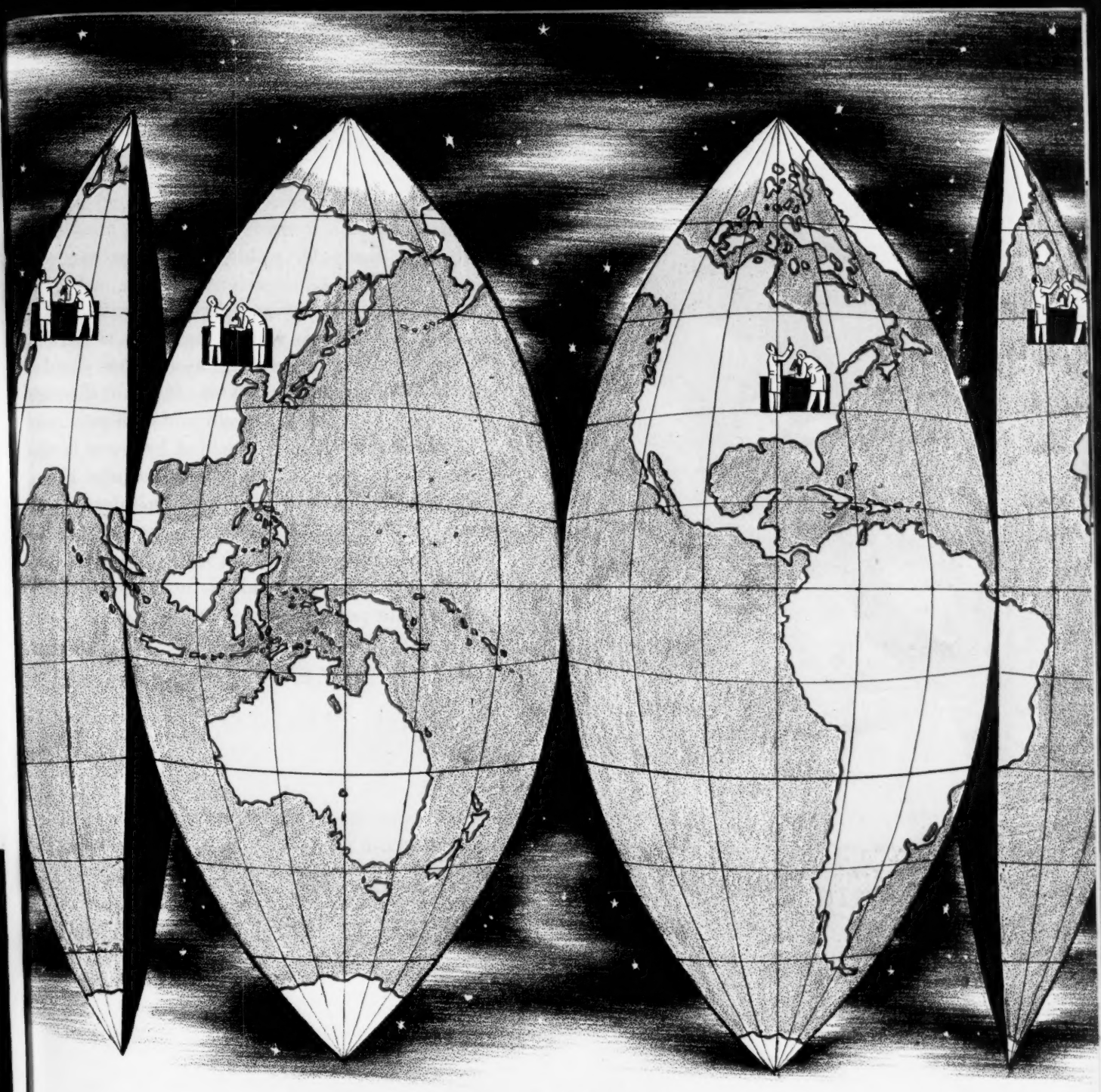
Zircon is highly resistant to acid reactions. It is not wetted by molten aluminum. Zircon does not grow and is a true super refractory.

TITANIUM
ALLOY MANUFACTURING COMPANY



GENERAL OFFICES AND WORKS: NIAGARA FALLS, N. Y., U. S. A.
EXECUTIVE OFFICES: 111 BROADWAY, NEW YORK CITY

Representatives for the Pacific Coast States . . . . L. H. BUTCHER COMPANY, Los Angeles, San Francisco, Portland, Seattle
Representatives for Canada . . . . . PRESCOTT & COMPANY, 774 St. Paul St. West, Montreal, Canada
Representatives for Europe . . . UNION OXIDE & CHEMICAL CO., Ltd., Plantation House, Fenchurch St., London, E. C., Eng.



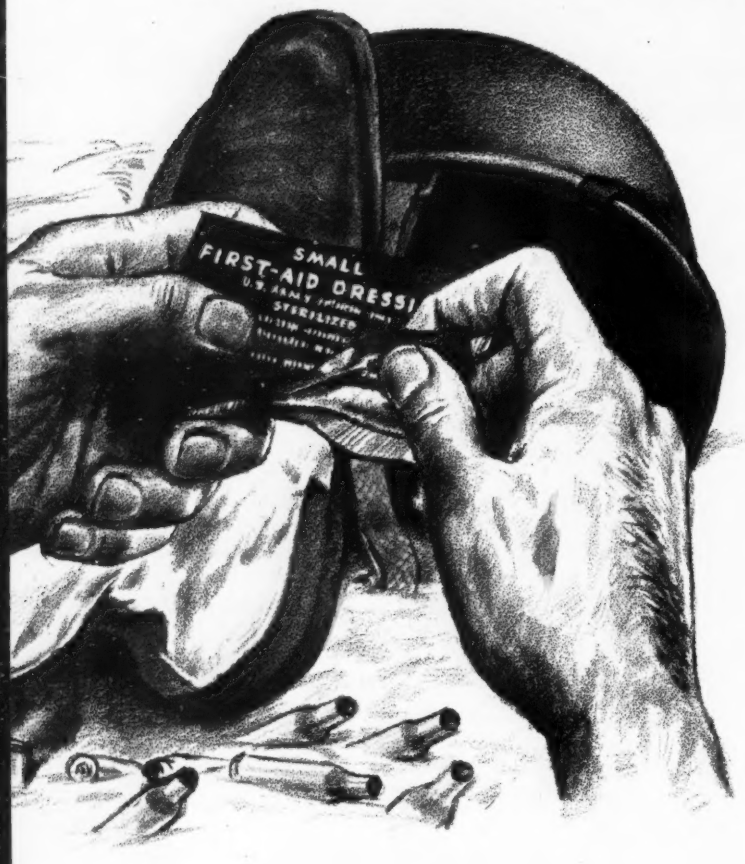
THIS IS BASIC . . .

This four-page advertisement is in Basic—a short form of English which may be learned very quickly. In it there are only 850 words, but the system is so well worked out that with them everything needed for the purposes of everyday existence may be said. With the addition of international words and a small number of science words, it is possible to put almost any science writing into Basic.

Our only reason for writing this in Basic is the thought that it may be of interest to our readers to see how a discussion of chemicals goes in this pint-size language. Basic is making such headway, even under war conditions, that it seems certain to take an important place in trade between nations when the war is ended.

Had this advertisement been pointed overseas, we would have given the sense in Basic of certain non-Basic words which are used. Such words are marked with a star so that you will be able to see when we go outside the word lists for science writing. Hercules Powder Company, Wilmington 99, Delaware.

Ethyl* Cellulose keeps front line dressings clean



Every American fighting man has with him a *dressing* for wounds when he goes to the front. This dressing has to be ready at all times—and it has to be *hospital-clean*. To *keep* it clean, through any amount of heat and cold and rain and dust and violent fighting, it is folded between layers of metal and paper coated with Hercules Ethyl Cellulose. This covering of ethyl cellulose, fixed tightly together at the edges by heat and pressure, makes an airtight, watertight seal. All the ethyl cellulose we make is now for war, but new uses for peacetime are coming to light very frequently. For details, send to the Hercules Cellulose Products Department.

Good supply of low-cost resin* may be what you're looking for

Vinsol Resin in any amount will be shipped as quickly as orders come in. Vinsol is a hard, dark resin with acid-number 93 and melting-point between 112°C. and 115°C. It is plastic under heat and pressure, and goes into stable mixtures with a number of plastic compounds. Among possible uses: as an emulsion-former; in paints and varnishes*; as an addition to shellac* in plastics; and a number of others. Vinsol may be the answer to a question which is now before you. You will get full details and a sample* by writing Naval Stores Department at Hercules.

Low cost prints with lacquer*

Beautiful printing on cloth is now being done at low cost with nitrocellulose lacquers. When made with the right formulas, these printing lacquers take full, sharp color into and through the cloth, and are sunproof. It takes only one-third the number of operations needed in other processes. Printed from round copper plates, or from stencils*, the colors are soft and clear, are undamaged by perspiration*, frequent washings with common soaps, or dry-cleaning. All sorts of cloth (even the thinnest) and paper have been printed without trouble by this method. Cellulose Products Department, Hercules Powder Company.

For paper and cloth coatings, and other uses . . . the Flexalyns

Flexalyn is an interesting rosin* ester* developed by Hercules. It makes stable mixtures in which the materials have no tendency to come out; thin coatings which will undergo much bending and twisting without cracking, and which take a solid grip on surfaces. In addition to their value in paper and cloth coatings, they are put to good use in inks, rubber compositions, lacquers, varnishes, waxes. You may have complete details on these and other uses for Flexalyn by requesting them from the Synthetics Department, Hercules Powder Company.

Paper coating from a resin in good supply

It is no longer necessary to have the hard-to-get natural resins such as Manila, Dammar, shellac for making good paper coatings or "varnishes." Such varnishes are made today with Hercules Poly-pale resin. Varnishes made with Poly-pale have good color, are bright, get dry quickly, and are sticky enough for gripping tightly. Details about Poly-pale and its uses may be had by sending to Naval Stores Department, Hercules.

"Dresinate", "Flexalyn", "Poly-pale", and "Vinsol" are trade-mark names registered by Hercules Powder Company in the U.S. Pat. Off.

Dresinates keep asphalt* in its place

In asphalt-base floor coverings such as linoleum*, there is frequently danger of the asphalt coming through the coating—but not when it has been made into an emulsion with Dresinates, Hercules resinates* which make solutions in water. For, like other emulsion-formers, Dresinates do not go into solution with asphalt. There are a number of other uses for Dresinates such as in polishes, soaps and disinfectants*, metal cleaners, inks, paints, and fireworks. Send in for details to Paper Makers Chemical Department, Hercules.

And here's a new one— sodium carboxymethylcellulose*

Now to be had only in small amounts for purposes of experiment, sodium carboxymethylcellulose is Hercules' newest form of cellulose. It goes into solution in water, and experiments are under way at Hercules to see how it may best be used in making emulsions, paints, cloth, oil, and so on. Judging by its behavior, it will be of value in making emulsions, in making things stable, and as a skin-former. For more about the possible uses of sodium carboxymethylcellulose, such as boiler compounds, creaming* latex*, oil-drilling* muds, leather coatings and others, send to Cellulose Products Department, at Hercules.

"Dresinate", "Flexalyn", "Poly-pale", and "Vinsol" are trade-mark names registered by Hercules Powder Company in the U.S. Pat. Off.

HERCULES POWDER COMPANY
INCORPORATED
1922A Delaware Trust Building
Wilmington 99, Delaware

Kindly send me further details on:_____

_____

_____

*Name*_____

*Title*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

II-48

HERCULES

CELLULOSE PRODUCTS • TERPENE & ROSIN CHEMICALS • SYNTHETICS
CHEMICAL COTTON • EXPLOSIVES • PAPER MAKERS CHEMICALS

PRINTED IN U. S. A.

SERVING AMERICA'S LABORATORIES

MONTREAL
CANADA

NEW YORK, N. Y.

4 CONVENIENTLY-LOCATED·· DISTRIBUTION STOCKS

Laboratories can now obtain their requirements of apparatus and chemicals from any of these four conveniently located, distribution stocks.

PITTSBURGH, PA.

ST. LOUIS, MO.

Fisher Scientific Co., Limited
904 St. James St. Montreal, P. Q., Canada

Eimer and Amend
635 Greenwich St. New York, N. Y.

Fisher Scientific Company
717 Forbes St. Pittsburgh, Pa.
2109 Locust St. St. Louis, Mo.

The Essential Combination for All Chemical Lime Service

CHEMICAL ANALYSIS OF MARBLEHEAD CHEMICAL LIME

	LUMP LIME	"CHEMICALLY PURE" HYDRATED LIME
Calcium as Ca (OH_2)		98.20
Calcium as CaO	97.90	74.40
Silica	.43	.40
Iron and Aluminum Oxides	.45	.44
Sulphur	Nil	Nil
Magnesium Oxide	.52	.35
Ignition Loss	.66	24.34

V HIGH CALCIUM
V LOW IMPURITIES
V GOOD PHYSICAL QUALITIES

MARBLEHEAD *High Calcium* CHEMICAL LIME

Proven Economy—for
STEEL • PAPER • BOXBOARD • WATER TREATMENT • LEATHER FOOD PRODUCTS PAINTS & VARNISHES TEXTILES • BRICKS GREASES • GLUE GLASS • SUGAR • RUBBER • DYESTUFFS • INSECTICIDES • CHEMICALS OF MANY KINDS, ETC., ETC.

Marblehead's seventy year record of leadership in the chemical lime field is the direct result of the in-born quality of the raw limestone, zealously retained throughout manufacture, under the strictest technical control.

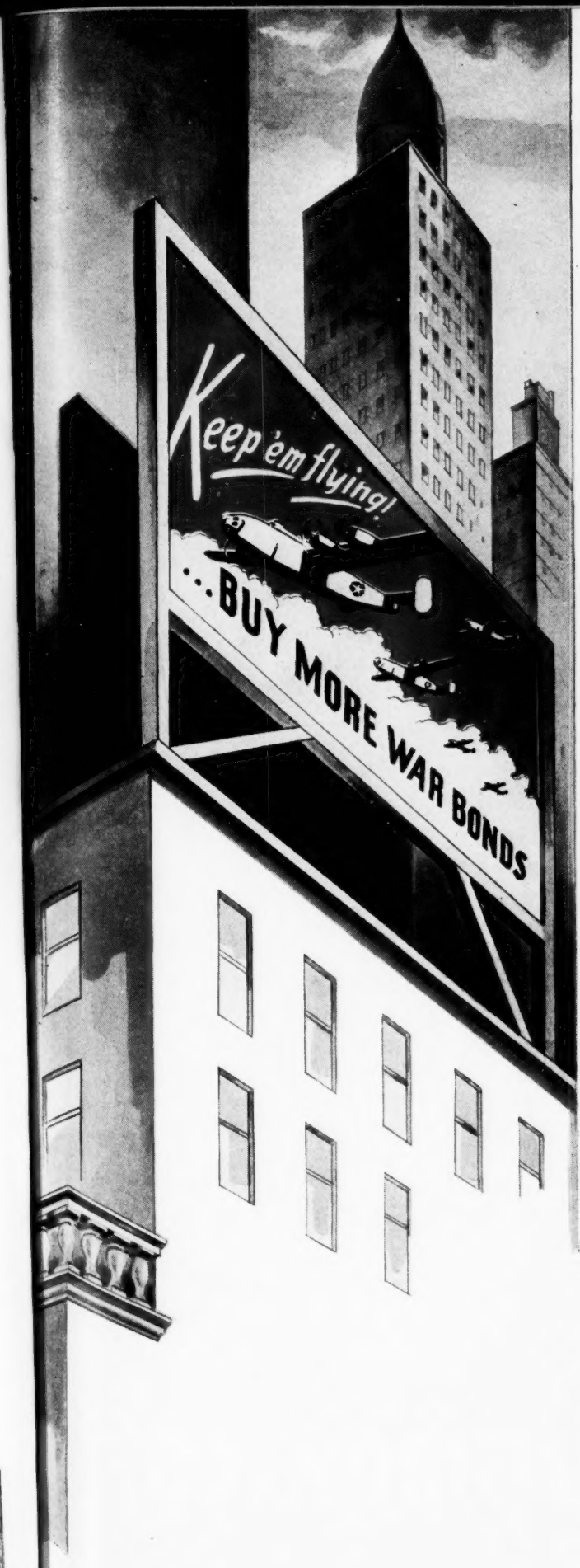
The high calcium content and low impurities provide powerful chemical reaction; the excellent physical characteristics assure smooth physical action. Thus, Marblehead brings to your processes safe and certain high efficiency operation . . . always.

★ FOUR FORMS ★

TRY A CAR NOW IN YOUR OWN PLANT

MARBLEHEAD LIME CO.

160 N. LaSalle St. Chicago, Ill.



In Printing...

Color is Life

Measured chemical purity keeps it alive!

Color commands attention.

It makes you look at a billboard along the highway, an advertisement in a magazine, a package on a dealer's shelf . . .

Artists use brilliant hues, and printers reproduce them, to increase your enjoyment of a beautiful picture, to promote your desire for innumerable things—to swing your mind, for instance, to the necessity of purchasing more War Bonds . . .

These arresting hues would be far less persuasive *without* chemical purity. Chemical purity, as found in Baker's Sodium Tungstate, Sodium Molybdate, Lead Acetate or Lead Nitrate, is essential to printing inks of brilliant color—gives them a brilliance that remains alive even when attacked by sunlight and moisture.

The printing and lithographic industry is only one of the many industries where a fine or industrial chemical, manufactured by Baker to exacting standards, makes possible the betterment of products or services.

Baker Chemicals, purity by the ton, have been made for a large number of the nation's leading concerns for the manufacture and processing of numerous products.

If you have a special chemical requirement involving purity to the decimal for war production or for the post-war reconversion program, we invite you to discuss your needs in confidence with Baker.

J. T. Baker Chemical Co., *Executive Offices and Plant:* Phillipsburg, New Jersey. *Branch Offices:* New York, Philadelphia and Chicago.

Baker's Chemicals

C. P. ANALYZED • FINE • INDUSTRIAL

Baker's

These G.I. SHOES Can Take It

What's that got to do with the shortage of Lanolin, Degras and Wool Grease for the home front? PLENTY!

Our soldiers' shoes can take it because they are made from top grade leathers that have been stuffed and waterproofed with wool grease to withstand mud, water and snow.

Today Lanolin and all grades of Wool Grease are on strict government allocation. As victory moves closer, the day approaches when America's largest selling brand of Lanolin, Degras and Wool Grease, the famous Nimco brand, will be available to all.

Lanolin and Wool Greases Help Fight for Victory

BUY WAR BONDS

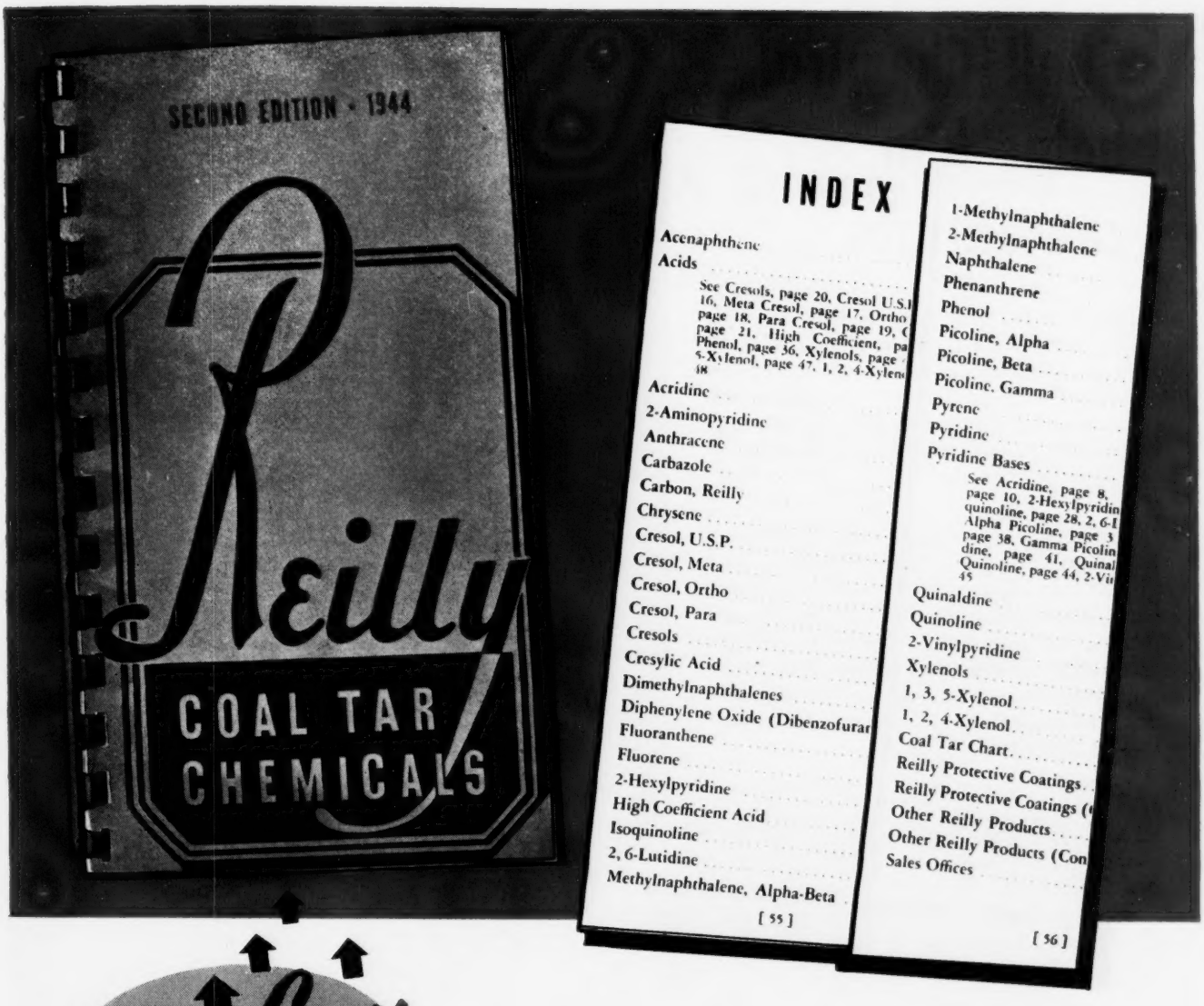
and support the fight

MALMSTROM · NIMCO BRAND · LANOLIN

N. I. MALMSTROM & CO.

America's Largest Suppliers of { **LANOLIN** • Anhydrous U.S.P. • Hydrous U.S.P. • Absorption Base • Technical
DEGRAS • Neutral and Common • Wool Greases

147 LOMBARDY STREET • BROOKLYN, NEW YORK



Your Copy

..Will be Sent on Request

● In the new edition of this booklet REILLY offers an unequaled diversity of coal tar chemicals. A number of new by-products of coal tar that have recently been made available through the REILLY development organization are described. Several products listed in the previous edition are now offered in higher purity than before—and others in pure form. Send for your copy today.

Reilly
COAL TAR
PRODUCTS

17 Plants to Serve the Nation

REILLY TAR & CHEMICAL CORPORATION

2513 S. Damen Ave.
CHICAGO 8, ILLINOIS

Merchants Bank Bldg.
INDIANAPOLIS 4, INDIANA

500 Fifth Avenue
NEW YORK 18, NEW YORK

Shell Chemical helps him concentrate

Butadiene, *first* produced in commercial quantities by Shell, helps make synthetic rubber for self-sealing gas tanks. *Result*—more planes and crews return safely from combat. And in submarines, Shell Chemical's mesityl oxide goes into coatings for battery boxes to prevent corrosive action. So it goes through our entire list.

WHEN THE JAPS hit us at Pearl Harbor on December 7, 1941, Shell Chemical had ready for immediate use by the Government, a number of vital products. They're now on allocation for war . . . but one of these days we'll be able to offer them to you. When that day of Victory arrives, and our laboratories and plants resume "peace work," remember the name SHELL CHEMICAL.

PHOTO, OFFICE WAR INFORMATION

PRODUCTS OF SHELL CHEMICAL

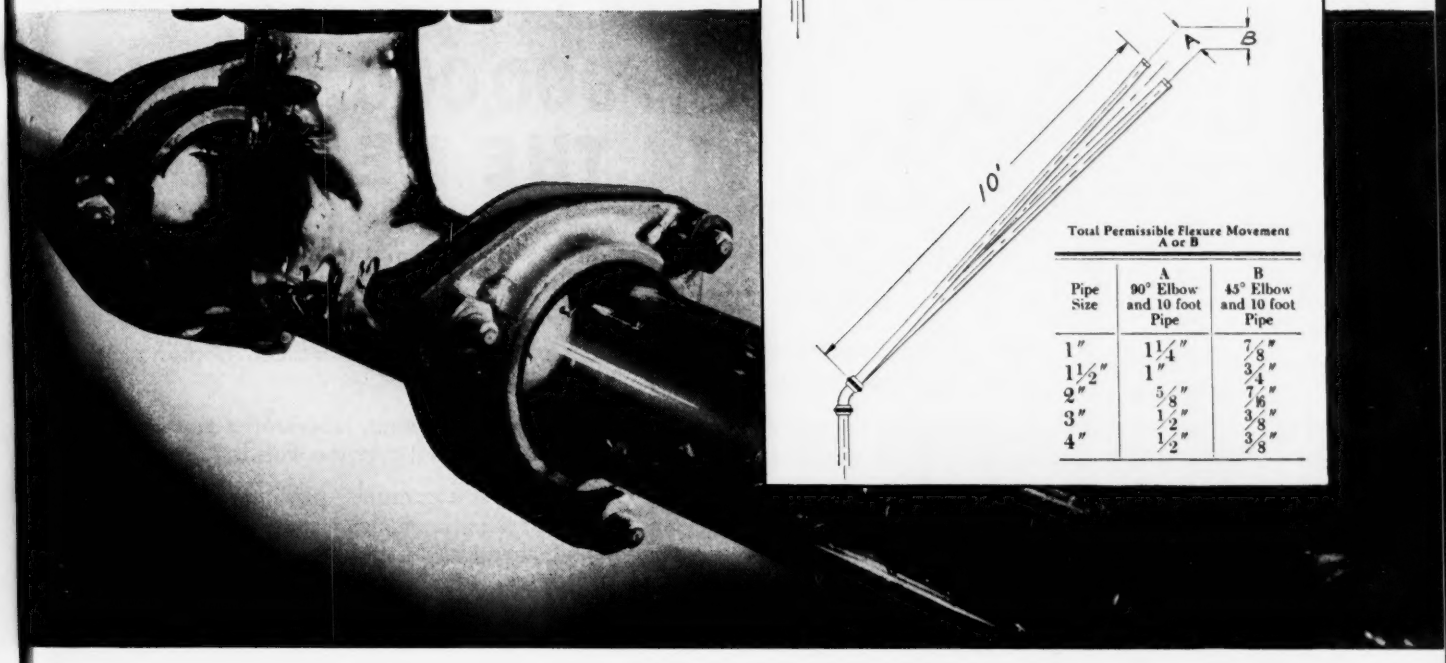
Butadiene
Mesityl Oxide
Acetone
Diacetone
Isopropyl Alcohol
Isopropyl Ether
Secondary Butyl Alcohol
Tertiary Butyl Alcohol
Methyl Ethyl Ketone
Methyl Isobutyl Ketone
Ammonia
Allyl Alcohol
Allyl Chloride

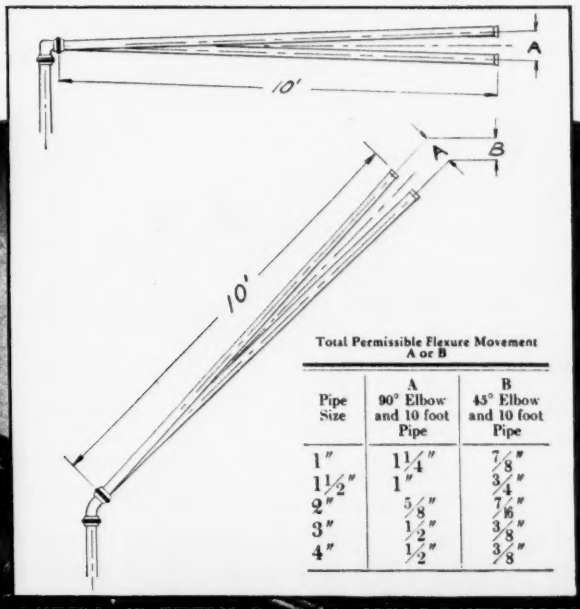
SHELL CHEMICAL *Division of* SHELL UNION OIL CORPORATION
100 BUSH ST., SAN FRANCISCO 4, CALIFORNIA

R. W. GREEFF & CO. *Eastern Sales Agent* 10 ROCKEFELLER PLAZA, NEW YORK 20. TRIBUNE TOWER, CHICAGO 11

How to provide for expansion and contraction in Pyrex pipe lines

EXPANSION JOINTS SELDOM NECESSARY WITH PYREX GLASS PIPING





Total Permissible Flexure Movement A or B

Pipe Size	A 90° Elbow and 10 foot Pipe	B 45° Elbow and 10 foot Pipe
1″	1¼″	7/8″
1½″	1″	3/4″
2″	5/8″	7/16″
3″	1/2″	3/8″
4″	1/2″	3/8″

Where a PYREX Glass pipe line has one or two 90° or 45° bends, expansion joints are generally unnecessary. Considerable movement can be taken up by flexing at the joint. The gasket material and the length of the piping running at a 90° or 45° angle to the line in which the movement occurs governs the amount of flexing safely permitted.

The table and sketch indicate permissible movement for lines with one 10 foot length at an angle to the main section. These values based on piping connected with hard asbestos gaskets materials are conservative. They should be doubled for two 10 foot lengths and tripled for three, etc.

PYREX Glass Piping, with a coefficient of expansion of .0000018 inch per inch per degree Fahrenheit, expands and contracts only 1/3 as much as steel or iron, about 1/6 as much as brass, and about 1/7 as much as aluminum. Expansion joints should be used only in straight lines with tightly fixed ends where thermal expansion will be 1/16″ or more.

This characteristic plus resistance to all acids, hot or cold (except HF), ease of cleaning, resistance to thermal and mechanical shock, and transparency, are features only PYREX Glass Piping can give you. Corning Engineers are ready to give you more complete information about PYREX Glass Piping as applied to your processes. Write for Bulletin 839, Industrial Sales Dept., CI-8, Corning Glass Works, Corning, New York.

Corning Glass Works, Industrial Sales Dept., CI-8
Corning, New York

Gentlemen:

I would like glass piping information immediately on the subject I have checked below. I understand there is no obligation.

- ☐ Valves
- ☐ Pyrex Piping and Heat Exchangers
- ☐ Installation Manual (Bulletin 839)
- ☐ Adaptors

Name.....

Firm.....

Street.....

City and State.....

"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

CORNING
Glass Works
Corning, New York

Pyrex Industrial Glass
BRAND

WILSON PULSAFEEDERS

(AS THEY NOW SERVE IN PROCESSING INDUSTRIES)

Will Help Re-locate

80,000,000 PEOPLE IN THE NEAR EAST

In the Near East, 80,000,000 people will move into planned-community areas, unprecedented in all the history of colonization, as to preparations and potentials.

Adequate water-supply and sanitation systems are assured to them. Certain food and other processing industries are planned for them.

WILSON *Pulsafeeders* will be key units in these systems, laboratories and industries, just as they are in similar flow-control lines all over the world.

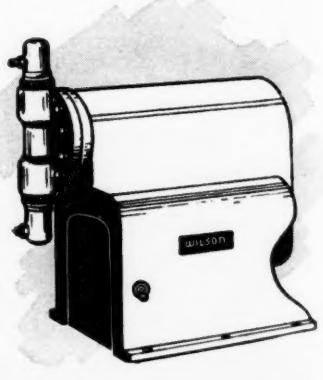
WILSON *Pulsafeeders* are the choice of these community-planning experts for the same reasons that they are the choice of maintenance experts for our armed forces, and of experts in medical, food, chemical, oil and other laboratories and industries, in which flow-control requirements for speed and accuracy are exacting. Their dependability, economy and efficiency are long-known and world-known.

Why not get detailed information concerning WILSON *Pulsafeeder* adaptability to your requirements?

WILSON PULSAFEEDERS—What They Are And What They Do

WILSON *Pulsafeeders* are eminently superior, almost infallible flow-controls to handle liquids of any nature in any pre-determined quantity from one cubic centimeter to four hundred or more gallons per hour. Accuracy, in most instances, is guaranteed at better than ⅛ of 1% through manually operated and/or automatic controls for single or multiple liquids. WILSON *Pulsafeeder* Systems are so flexible and adaptable, they satisfy an almost limitless range of requirements.

Let us send you details of their packless, positive-displacement piston action . . . of the absence of packing glands and breakable diaphragms . . . freedom of contact between working parts and flowing liquids. Let us tell you how they will meet your specific requirements for capacity, accuracy, economy, durability and dependability, as those requirements apply to chemical proportioning, food and other processing, laboratory work, water and sewage treatment . . . or to the handling of problem liquids such as acids, volatiles, slurries, etc., in mono- or multi-flow . . . and about our capacity to supply almost any need in Automatic Filling Machines because of our acquisition of Clevon Products Company.



AD M-C

WILSON CHEMICAL FEEDERS, INC.

215 CLINTON STREET (P. O. Box 998) BUFFALO 4, N. Y.

ESTABLISHED 1923 . . . WITH EXPERIENCE IN ALLIED LINES SINCE 1914

Sharples
MONOAMYLAMINE

Sharples commercial Monoamylamine is a mixture of various isomers, the boiling points of which range from 82 to 104°C. It is a colorless liquid having a distinct ammoniacal odor and is readily miscible with water and most commonly used solvents.

As a raw material, Monoamylamine is used in the manufacture of various dyestuffs and rubber accelerators. It is also of interest for the synthesis of antioxidants, emulsifying agents, amylated acid amides and many other products in which oil solubility is a factor. The properties listed below may suggest other applications worthy of investigation. Samples will be sent gladly for evaluation, at your request.

SPECIFICATIONS

Color	Water-white
Specific Gravity at 20°/20°C.	0.76-0.78
Water Dilution	At least 20:1
Monoamylamine Content	At least 90%
Distillation:	
Initial Boiling Point	Not below 84°C.
Not less than 95%	Below 100°C.
Final Boiling Point	Not above 110°C.

OTHER PROPERTIES

Molecular Weight (Theoretical)	87.16
Average Weight per Gallon	6.41 lbs.
Flash Point (open cup)	65°F.
Refractive Index at 20°C.	1.417
Surface Tension at 13°C.	24.4 dynes/cm.
Heat of Vaporization	108 cal./gm.
Specific Heat at Room Temp.	0.65 cal./gm.
Viscosity at 20°C.	1.02 centipoise
Coefficient of Expansion per deg. C.	0.00116 (Calc'd).

Vapor Pressures:

Temp. °C.	*Mm. Hg.*
28	50
42	100
63	250
80	500

* * *

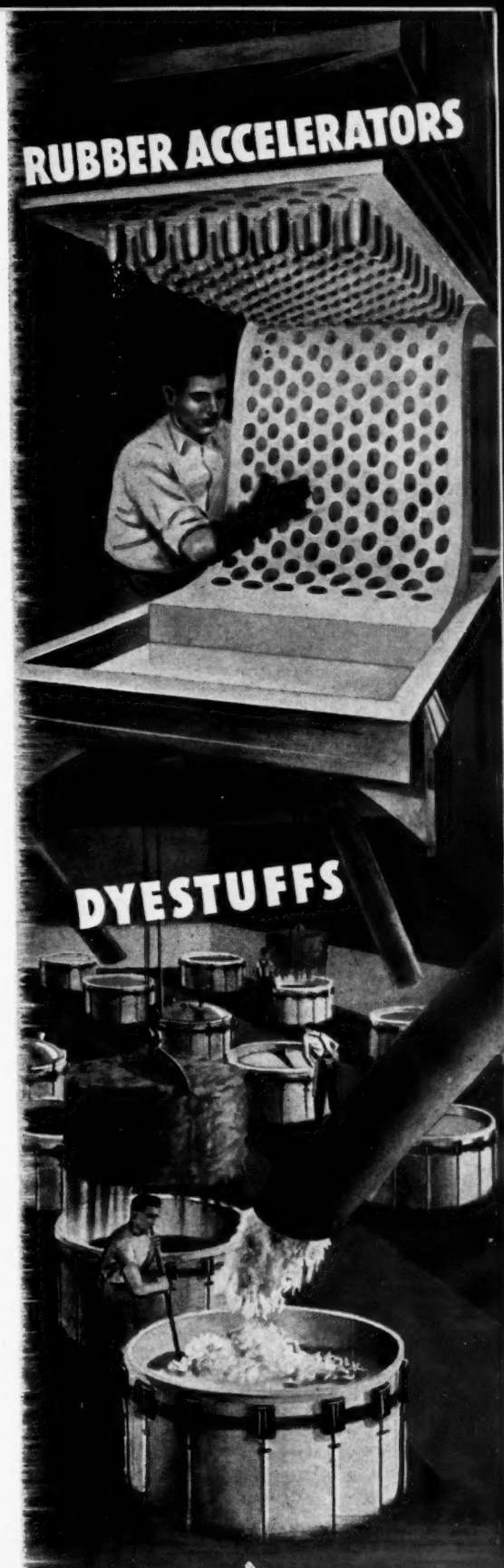
Sharples also manufactures the Ethylamines and Butylamines. Write for a copy of the 13th edition of "Sharples Synthetic Organic Chemicals", in which the properties of these products are described.

ARMY E NAVY

SHARPLES CHEMICALS INC.

PHILADELPHIA CHICAGO NEW YORK

SHARPLES TRADE MARK CHEMICALS



ALSO OF INTEREST FOR

ANTIOXIDANTS
EMULSIFYING AGENTS
AMYLATED ACID AMIDES

SHARPLES SYNTHETIC ORGANIC CHEMICALS

PENTASOL (AMYL ALCOHOLS)
PENT-ACETATE (AMYL ACETATE)
PENTALARM (AMYL MERCAPTAN)
BURAMINE (CRUDE BUTYL UREA)
PENTAPHEN (p-tert-AMYL PHENOL)
o-AMYL PHENOL DIAMYL PHENOL
DIAMYLPHENOXY ETHANOL

MONOAMYLAMINE DIAMYLAMINE TRIAMYLAMINE
MONOBUTYLAMINE DIBUTYLAMINE TRIBUTYLAMINE
MONOETHYLAMINE DIETHYLAMINE TRIETHYLAMINE
DIETHYLAMINOETHANOL
ETHYL MONOETHANOLAMINE ETHYL DIETHANOLAMINE
MIXED ETHYL ETHANOLAMINES
DIBUTYLAMINOETHANOL
BUTYL MONOETHANOLAMINE BUTYL DIETHANOLAMINE
MIXED BUTYL ETHANOLAMINES

MIXED AMYL CHLORIDES DICHLOROPENTANES
AMYL NAPHTHALENES MIXED AMYLENES

SHARPLES CHEMICALS INC.

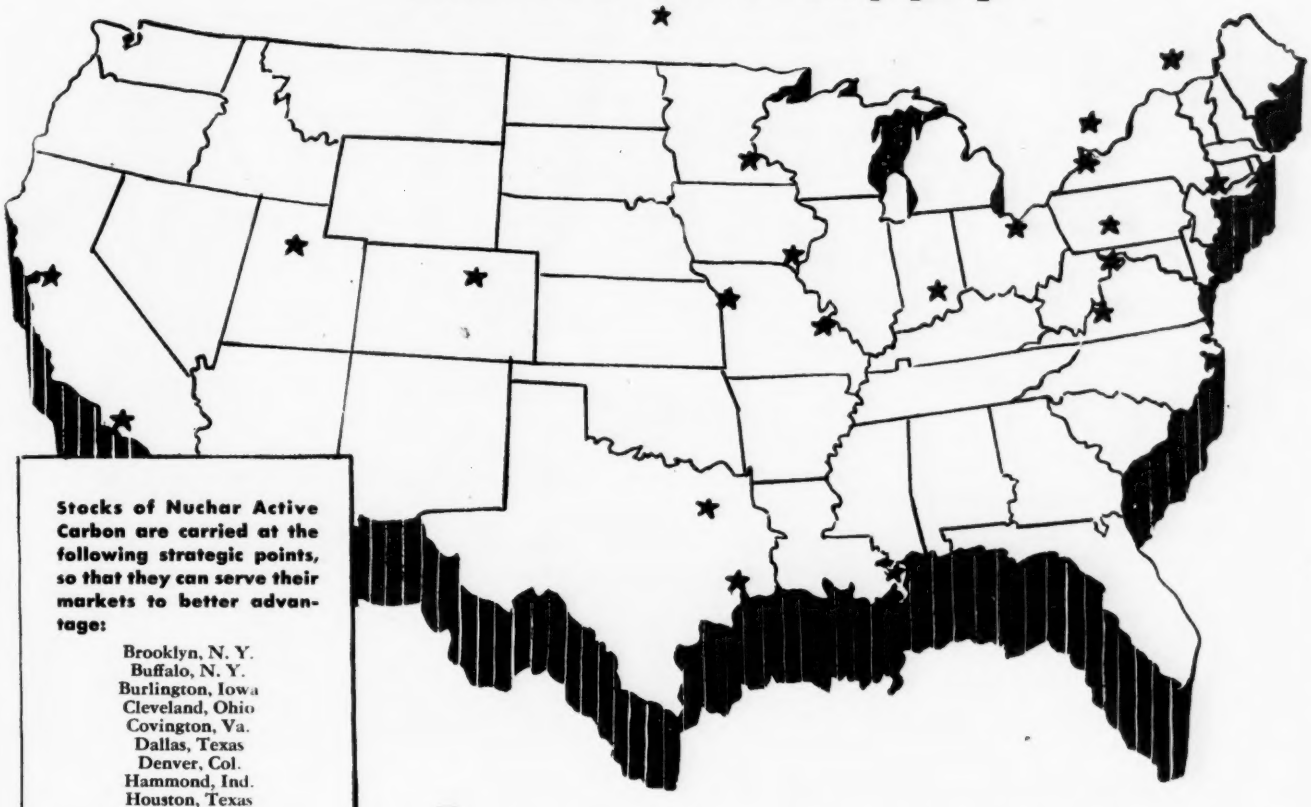
EXECUTIVE OFFICES: PHILADELPHIA, PA.
PLANT: WYANDOTTE, MICH.

Sales Offices

New York Chicago Salt Lake City
West Coast: MARTIN, HOYT & MILNE, INC., Los Angeles . . San Francisco . . Seattle

When fast delivery counts

—count on NUCHAR coast-to-coast service and supply



Stocks of Nuchar Active Carbon are carried at the following strategic points, so that they can serve their markets to better advantage:

Brooklyn, N. Y.
Buffalo, N. Y.
Burlington, Iowa
Cleveland, Ohio
Covington, Va.
Dallas, Texas
Denver, Col.
Hammond, Ind.
Houston, Texas
Kansas City, Mo.
Los Angeles, Calif.
Montreal, Canada
New Orleans, La.
Piedmont, W. Va.
St. Louis, Mo.
St. Paul, Minn.
Salt Lake City, Utah
San Francisco, Calif.
Toronto, Canada
Tyrone, Pa.
Winnipeg, Canada

Nuchar Active Carbons

★

Abietic Acid

★

Snow Top Precipitated Calcium Carbonate

★

Liquid Caustic Soda **Chlorine**

★

Lignin **Liqro Crude Tall Oil**

★

Indusoil Distilled Tall Oil

★

Tall Oil Pitch

★

Sulphate Wood Turpentine

IF you have a purification problem that can be solved by *ad*sorption, you can look to us with confidence that deliveries of Nuchar Active Carbon will be made in the shortest possible time. Nuchar Active Carbon is finding so many new uses that frequently we are called upon to make rush shipments.

There are strategically located stocks of Nuchar Active Carbon convenient to important consuming centers to service customers requiring less than carload deliveries. These warehouse stock points form a nation-wide network which assures local delivery service in virtually every part of the United States and Canada. Nuchar is manufactured in three plants—namely, Covington, Virginia; Piedmont, West Virginia; and Tyrone, Pennsylvania, from where all carload shipments are made.

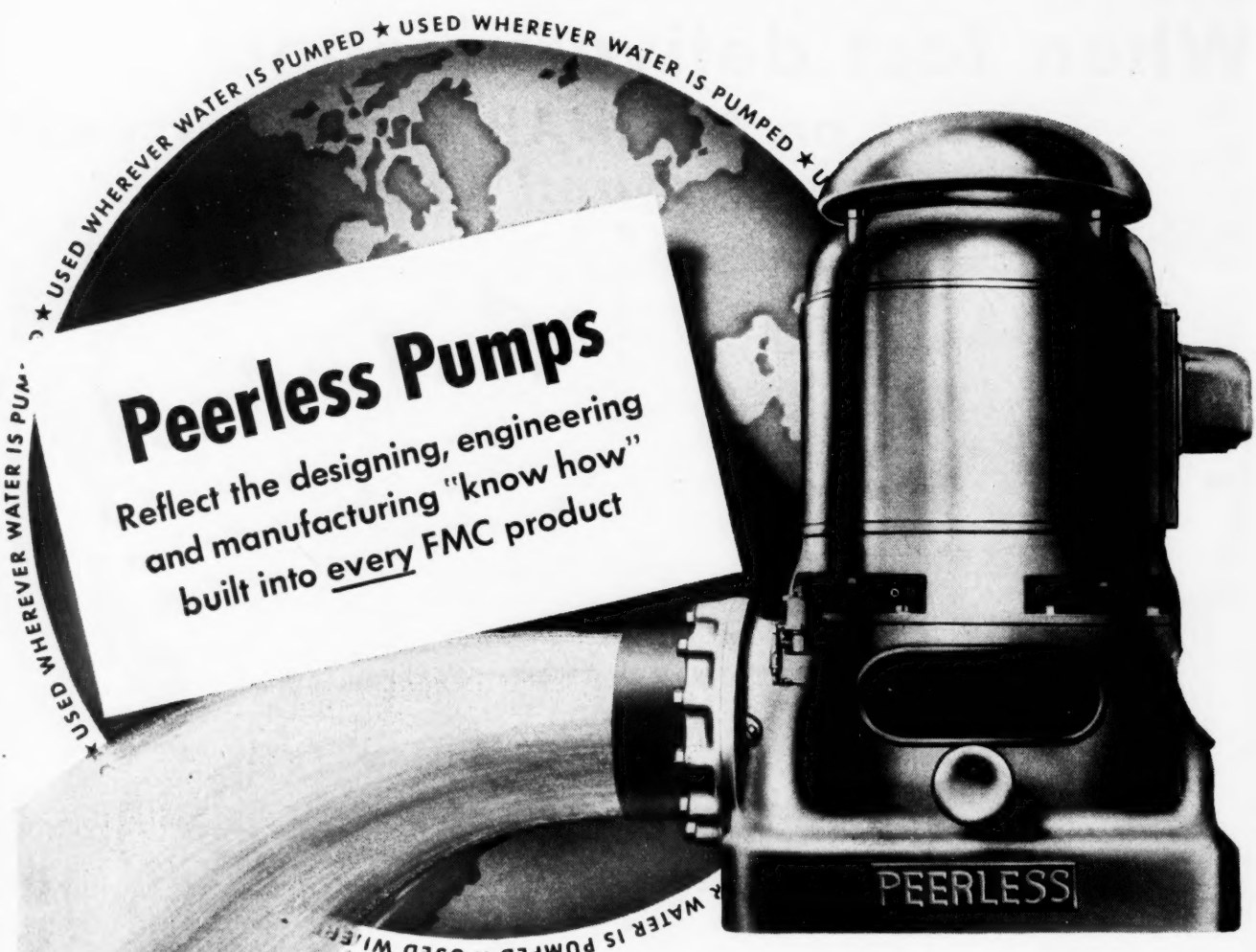
Each plant is fully equipped with a laboratory devoted exclusively to problems of manufacture and use of Active Carbon. Your technical staff will find Active Carbon a useful tool in your process. We will gladly send you a sample of Nuchar best fitted to your problem.

NUCHAR

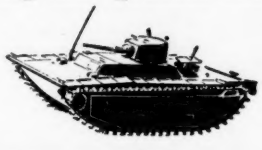
INDUSTRIAL CHEMICAL SALES

DIVISION WEST VIRGINIA PULP & PAPER COMPANY

230 PARK AVENUE, NEW YORK 17, N.Y.
35 E. WACKER DRIVE, CHICAGO 1, ILLINOIS
748 PUBLIC LEDGER BLDG., PHILADELPHIA 6, PA.
844 LEADER BLDG., CLEVELAND 14, OHIO


★ USED WHEREVER WATER IS PUMPED ★ USED WHEREVER WATER IS PUMPED ★
Peerless Pumps
Reflect the designing, engineering and manufacturing "know how" built into every FMC product
PEERLESS

★ PEERLESS PUMPS are the nation's preferred turbine pumps for municipal, agricultural and industrial uses... preferred because of their superior engineering and greater mechanical stability. Peerless Pumps are products of the same company that created and builds "Water Buffalo" amphibious tanks.



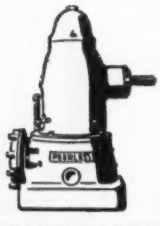
FOOD MACHINERY CORPORATION

EXECUTIVE OFFICES: SAN JOSE, CALIFORNIA

Peerless Pump factories at Los Angeles and Fresno, California; and Canton, Ohio

LAKELAND
RIVERSIDE
HOOPESTON

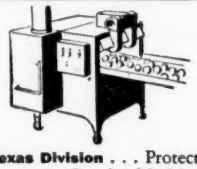
Other Typical FMC Products



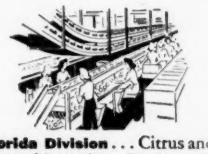
PEERLESS PUMP DIVISION... Deep well turbines, hi-lifts and Pumps handling water for every purpose. Los Angeles and Fresno, California; and Canton, Ohio.

Sprague-Sells Division... A complete line of machinery for canning foods. Hoopeston, Ill.

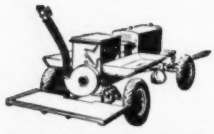
Anderson-Barngrover Division Complete line of machinery for canning foods. San Jose, Calif.



Texas Division . . . Protective Processes. Canning Machinery, Fruit and Vegetable Packing Equipment. Harlingen, Texas.



Florida Division... Citrus and Vegetable Packing Equipment, and Food Protective Processes. Dunedin and Lakeland, Florida.

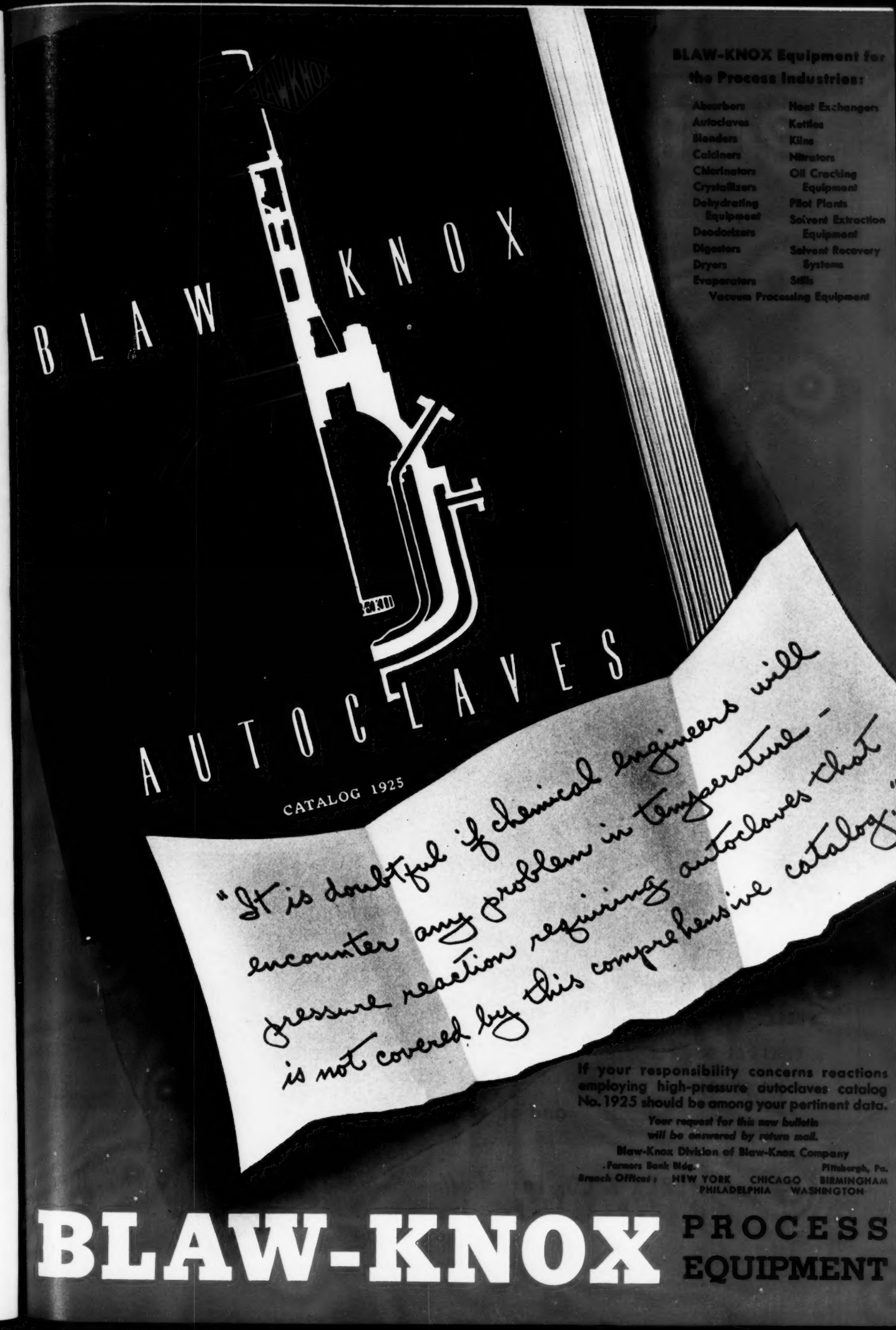


Niagara Sprayer & Chemical Co. . . . Insecticides for protecting crops from insects and disease. Middleport, N.Y.; Jacksonville, Fla.; and Burlington, Ont., Can.

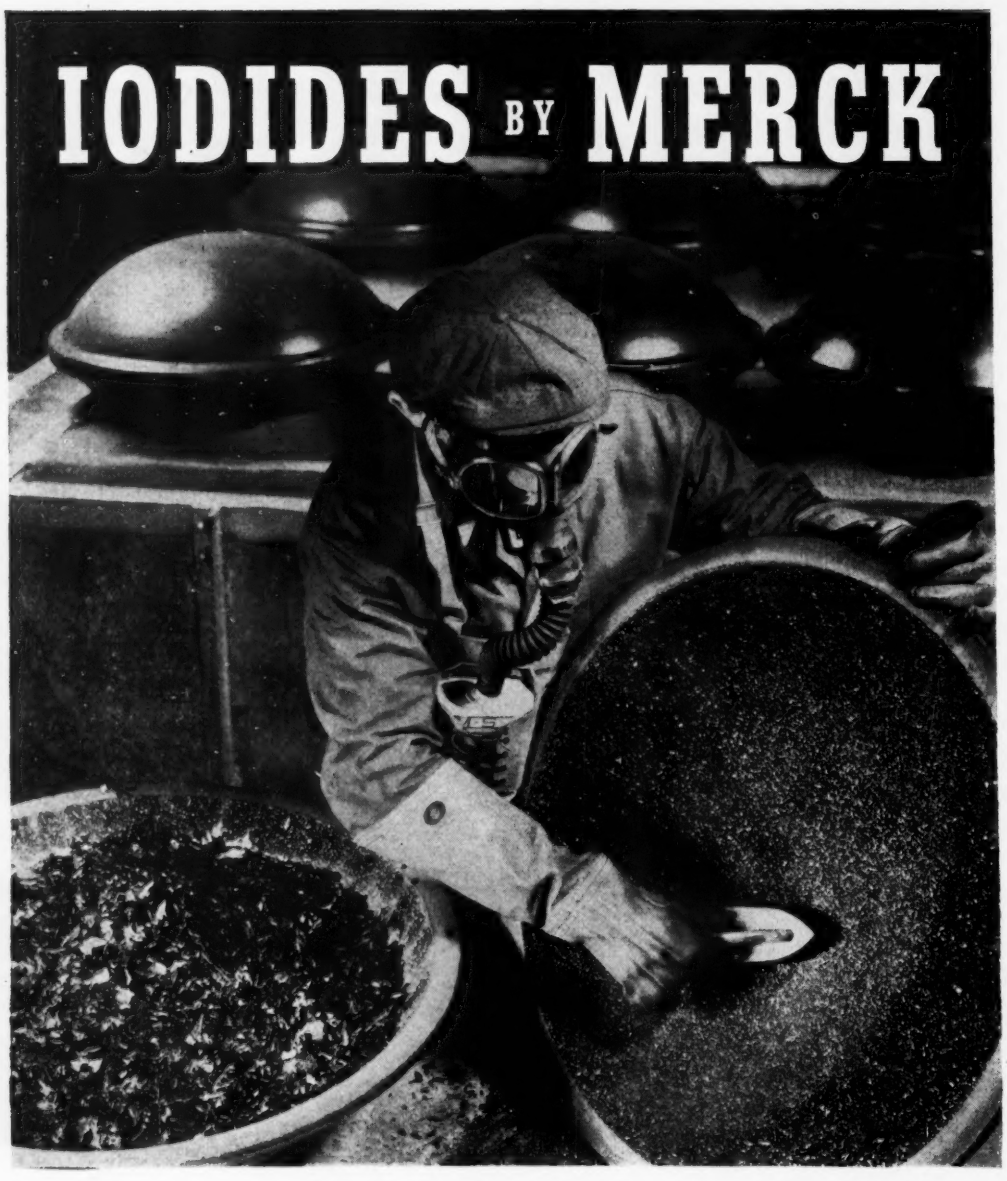
Riverside Division. Citrus Packing Equipment, Automatic Box Making & Lidding Machinery. Fruit and Vegetable Protective Processes. Riverside, Calif.

Bean-Cutler Division. Sprayers, Dusters and Packing House Equipment for Fruits & Vegetables, Fog Fire Fighters, Turbine Pumps. San Jose, California.

John Bean Mfg. Co. Fog Fire Fighters, Bean Royal Spray Pumps, Automotive Service Station Equipment. Lansing, Mich.


BLAW-KNOX Equipment for the Process Industries:
Absorbers
Autoclaves
Blenders
Calciners
Chlorinators
Crystallizers
Dehydrating Equipment
Deodorizers
Digesters
Dryers
Evaporators
Heat Exchangers
Kettles
Kilns
Nitrators
Oil Cracking Equipment
Pilot Plants
Solvent Extraction Equipment
Solvent Recovery Systems
Stills
Vacuum Processing Equipment
BLAW KNOX
AUTOCLAVES
CATALOG 1925
"It is doubtful if chemical engineers will encounter any problem in temperature - pressure reaction requiring autoclaves that is not covered by this comprehensive catalog."
If your responsibility concerns reactions employing high-pressure autoclaves catalog No. 1925 should be among your pertinent data.
Your request for this new bulletin will be answered by return mail.
Blaw-Knox Division of Blaw-Knox Company
Farmers Bank Bldg. Pittsburgh, Pa.
Branch Offices: NEW YORK CHICAGO BIRMINGHAM PHILADELPHIA WASHINGTON
BLAW-KNOX PROCESS EQUIPMENT

IODIDES BY MERCK

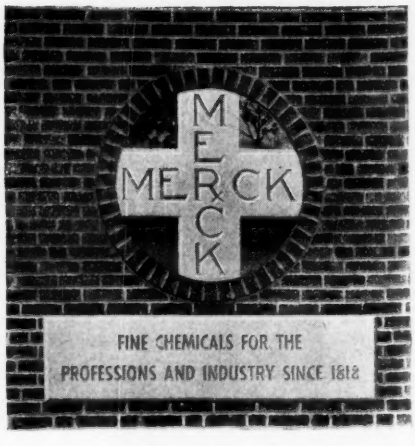


Sublimation of Iodine Merck

Standardize

ON MERCK IODIDES FOR PURITY, RELIABILITY, AND A CENTRAL SOURCE OF SUPPLY

Ammonium Iodide
Iodine
Iodoform
Potassium Iodide
Potassium Iodide Mixtures
Sodium Iodide
Thymol Iodide
and other Iodine Salts



MERCK & CO., Inc. *Manufacturing Chemists* **RAHWAY, N. J.**

New York, N. Y. · Philadelphia, Pa. · St. Louis, Mo. · Elkton, Va. · Chicago, Ill. · Los Angeles, Cal.

In Canada: MERCK & CO., Ltd., Montreal and Toronto

A SMOOTH, SURE, SAFE LIGHT

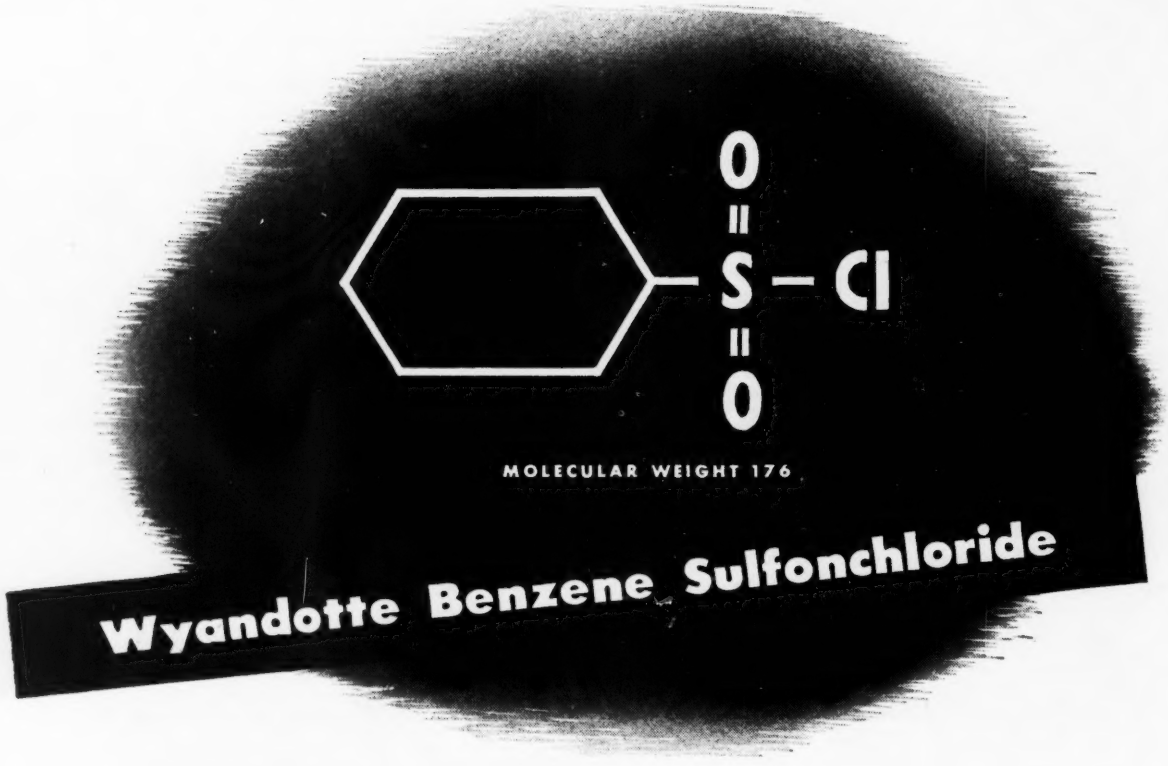
International Potassium Chlorate

Strike a match. Does it flare smoothly, instantly? Light without sputter or flying spark? Then it is made with high quality *Potassium Chlorate*, which supplies oxygen to ignite the match. International controls the manufacture of *Potassium Chlorate* from raw material to finished product. Potash salts are shipped from International's mine in New Mexico to its chemical plant near Cincinnati where special processes have been developed to maintain the purity and uniformity of International *Potassium Chlorate*. Now used primarily for ammunition and other war materials, a large tonnage of this essential chemical will eventually be available for matches, signal flares and a variety of commercial products.

International Minerals & Chemical Corporation,
20 North Wacker Drive, Chicago 6, Illinois.

International MINERALS and CHEMICALS

CHEMICALS • PHOSPHATE • POTASH • FERTILIZER



ANOTHER *U.C.P. CHEMICAL

PROPERTIES OF BENZENE SULFONCHLORIDE

	TECHNICAL	*REFINED*
Physical characteristics	Dark brown liquid	Water white liquid
Purity	85–90%	97–100%
Melting point	8–14.5° C	14.5° C
Distillation range	220–425° C	244–250° C
Water solubility	Very slight	Very slight
Specific gravity	Approximates refined	1.36 @ 15° C
Weight per gallon	Approximates refined	11.34 lbs. @ 25° C

**Undiscovered Commercial Potential*

Wyandotte now offers, for your investigation, benzene sulfonchloride in both technical and refined grades. It undergoes most of the reactions of typical acid chlorides, but also under certain conditions acts as a chlorinating agent, or as an oxidizing agent. It hydrolyzes slowly. Its reactions with amines, alcohols, amides, reducing agents, and other compounds should make it of value in organic syntheses, and in the preparation of dyestuffs, tanning agents, pharmaceuticals, plasticizers and other products.

Members of Wyandotte's Technical Staff are at your service in any investigation you may wish to make into the properties and applications of benzene sulfonchloride. Write for samples — today!

WYANDOTTE CHEMICALS CORPORATION, Michigan Alkali Division
WYANDOTTE, MICHIGAN • OFFICES IN PRINCIPAL CITIES

Wyandotte
REG. U. S. PAT. OFF.

Soda Ash • Caustic Soda • Chlorine • Bicarbonate of Soda • Calcium Carbonate • Calcium Chloride • Dry Ice • Aromatic Intermediates • Hydrogen

Will the can that sprays TNT at Panzers spray the ants in your plants?

● It's an uncanny can. It wrecks giant tanks and other mechanized monsters. It's also used as a delayed-action land mine . . . a demolition charge . . . a booby trap.

Yet this new high explosive weapon is small and light enough to be carried in a soldier's pocket as a hand grenade!

You and this can are old friends. You, too, have used it to eliminate pests. Before the war it was a can for insecticides. After the war, it will again carry chemicals to protect your garden against insects, your clothes against moths, your children against infection.

It will carry new and better insecticides, too. (The industry is learning lots of new things in this war!) And these insecticides will come to you full strength—safely packed in cans.

To do our war job, we've developed new ideas and new skills, too. That's why, as we look ahead, we see *new and better things in Continental cans.*

POST-WAR PLANNING: We'll be glad to discuss future uses or improvements of your product or package and help in your post-war planning. Write Post-War Planning Dept., 100 E. 42nd Street, N.Y.C., or Continental Can Company of Canada, Limited, Montreal.

CONTINENTAL CAN COMPANY

NEW AND BETTER THINGS IN CONTINENTAL CANS

Awarded to Plant 78, Chicago • Illinois

ARMY E NAVY

SAVE TIN CANS—HELP CAN THE AXIS

Check List* #1

of properties which may suggest new applications of

SONNEBORN PURIFIED HYDROCARBON OILS

in your manufacturing processes

THE field of application for purified petroleum hydrocarbon oils, sometimes referred to as white mineral oils, is widening constantly. Exploration of their possibilities is often followed by their adaptation to meet specific requirements arising in the manufacture of new products. Actually, these oils have been for some time replacing ordinary mineral oils or oils of other origin because of certain unusual characteristics possessed by purified hydrocarbon oils.

The recognition of these characteristics of purified hydrocarbon oils —now commercially available—is very often the first link in a chain of events leading to their ultimate adoption for new uses. Among their characteristics are those listed at the right.

These and other characteristics suggest a wide variety of specific applications in many fields and may well hold the solution to one or more problems of your own.

---

* This is the first in a series of bulletins focusing industry's attention on the possibilities of purified petroleum hydrocarbon oils. The next will appear in an early issue of this publication.

PARTIAL LIST OF CHARACTERISTICS OF SONNEBORN PURIFIED HYDROCARBON OILS

- ☐ No unsaturated hydrocarbons
- ☐ Substantial freedom from aromatic hydrocarbons
- ☐ Composition, predominantly, of saturated paraffins and napthenes
- ☐ Free miscibility with all petroleum products, many essential oils, and most animal and vegetable fats, oils and waxes
- ☐ Freedom from color, odor and taste
- ☐ Non-drying
- ☐ Absence of gumminess or stickiness
- ☐ Non-supportive to pathogenic bacterial and mold growth
- ☐ No carbonizable substances
- ☐ Normally non-corrosive and non-sludging

RANGE OF PHYSICAL CHARACTERISTICS

Specific Gravity: 0.775 to 0.895 @ 60°F.
Saybolt Viscosity: 30 to 345 @ 100°F.
Distillation Range: 370 to 800°F.
Flash Point (Open Cup): 170 to 420°F.
Pour Test (Open Cup): +40° F. to −35° F.

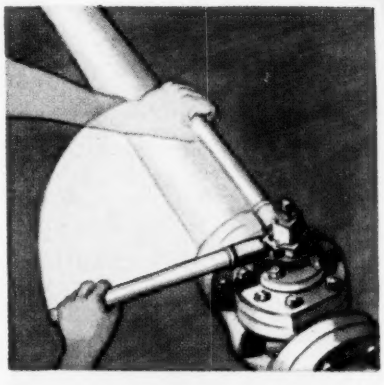
Please direct inquiries on specific problems to Department of Industrial Research

L. SONNEBORN SONS, INC.

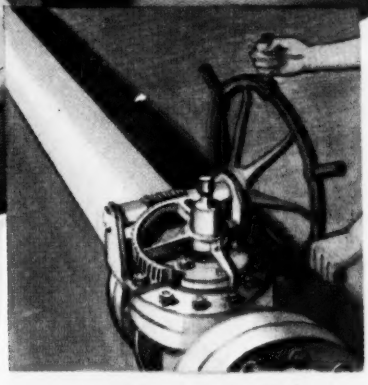
Refiners of Petroleum

88 Lexington Avenue, New York 16, N. Y.

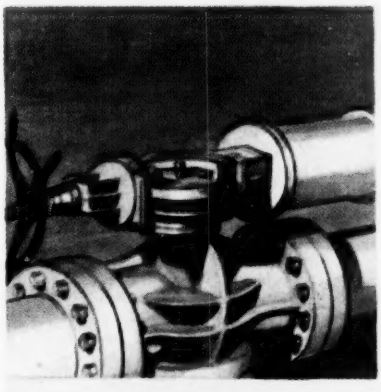
Does TIME *mean anything to you in valve operations?*



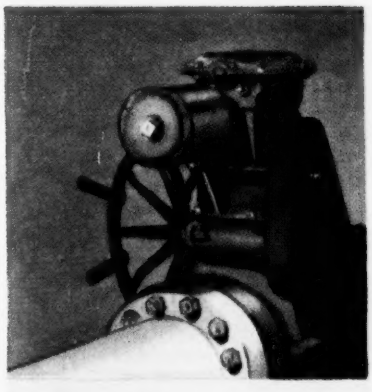
QUARTER TURN
FOR SIMPLICITY OF CONTROL



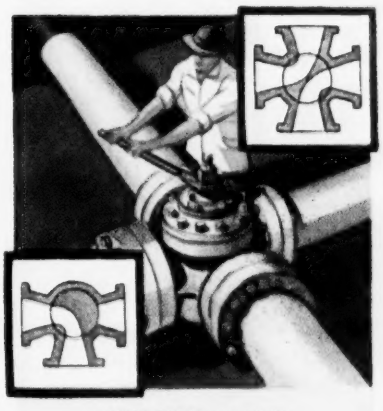
QUICK GEAR OPERATION
FOR HEAVY DUTY SERVICE



CYLINDER OPERATION
FOR AUTOMATIC CONTROL



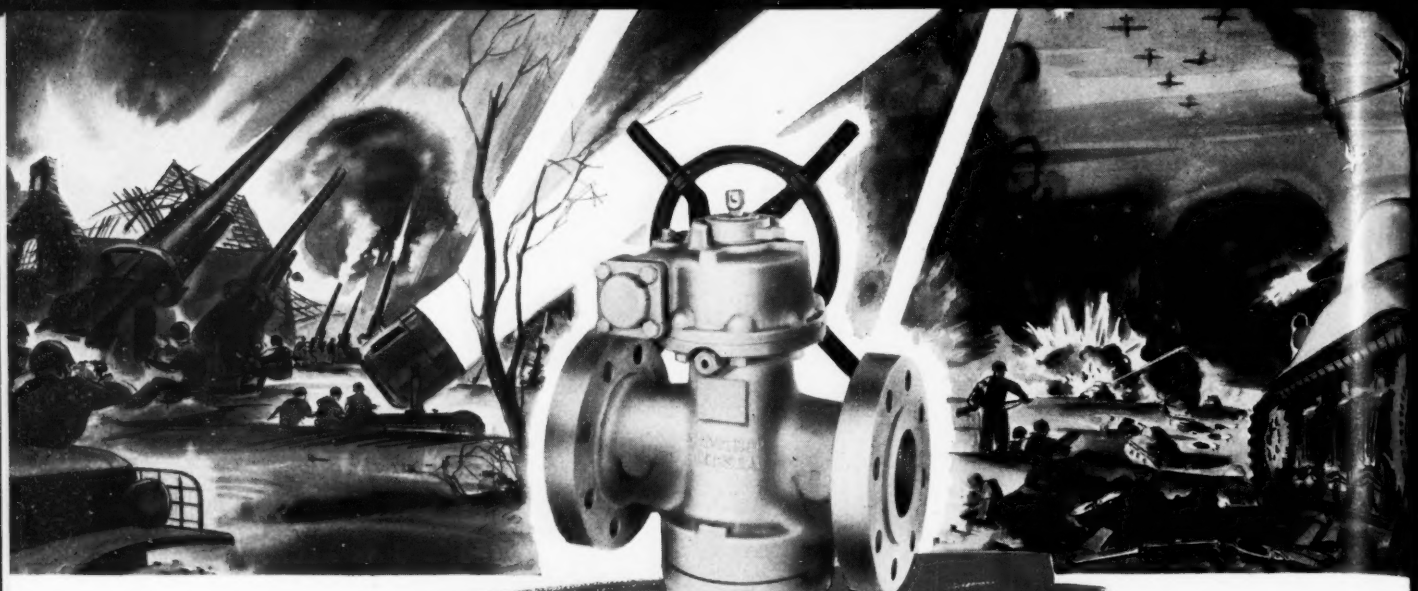
ELECTRIC MOTOR OPERATION
FOR REMOTE CONTROL



MULTIPORT DESIGN
FOR SELECTIVE SWITCHING

Nordstrom Valves

SAVE TIME • KEEP UPKEEP DOWN



BACK OF THE ATTACK a mighty valve looms

Some say: *"It's a mechanized War."*

Others state: *"It's a chemical War."*

Still others claim: *"It's an aerial War."*

Regardless of what it may be called, War relies upon industrial science to provide our fearless fighters with the implements of Victory.

100-OCTANE GASOLINE. America has rushed to completion scores of aviation fuel refineries, all of which are using Nordstrom Valves to insure uninterrupted flow and absolute control of lines.

SYNTHETIC RUBBER. The tire companies, the U. S. Government and scores of petroleum refineries have joined forces to offset the shortage of natural rubber. The highly technical processes of synthetic rubber production require lubricated plug valves—Nordstroms.

BLOCK BUSTER EXPLOSIVES. Our chemical plants and munitions makers have far outclassed the enemy by development of the most devastating explosives. In these plants where danger must be minimized and valves must offer the highest degree of dependability, Nordstroms are considered critical necessities.

LIGHT METALS. Aluminum and magnesium, now produced in quantities in excess of war's needs, are the result of advanced chemical technique. Nordstrom Valves are rendering vital service in all the modern plants producing these critical light metals.

Of no less importance in contributing to the War effort is the army of Nordstrom Valves serving the gas industry, the petroleum industry in all its branches, shipbuilding yards and hundreds of plants producing war materiél.

It has been a Herculean task to meet this overwhelming valve demand in the face of Government directives over which we have had no control. But by intensive effort we are increasing our output and speeding up deliveries.

Nordstrom

LUBRICATED VALVES

Sealdport Lubrication

MERCO NORDSTROM VALVE COMPANY — *A Subsidiary of Pittsburgh Equitable Meter Company*

Main Offices: 400 Lexington Avenue, Pittsburgh 8, Penna. • *Branches:* Atlanta, Boston, Brooklyn, Buffalo, Chicago, Columbia, Houston, Kansas City, Los Angeles, New York City, Oakland, San Francisco, Seattle, Tulsa • *Canadian Licensees:* Peacock Bros., Ltd., Montreal
European Licensees: Audley Engineering Co., Ltd., Newport, Shropshire, England • *South American Representative:* The Armco Int'l Corp. • *Main Office:* Middletown, O.
PRODUCTS: Nordstrom Lubricated Valves; Air, Curb and Meter Cocks • Nordco Valve Lubricants • EMCO Gas Meters • EMCO-McGaughy Integrators EMCO Regulators • Pittsburgh-National Meters for Gasoline, Grease, Oil, Water and other Liquids • Stupakoff Bottom Hole Gauges

Five Hooker Chlorides anxious to give up their Chlorine

Here are five Hooker Chlorides that are being widely used in chlorinating reactions. Their application is so widespread that we can only touch briefly here on a few of their uses in organic synthesis.

Sulfuryl Chloride, SO_2Cl_2, is commonly used to form organic acid chlorides. It may be used to produce chlor derivatives of phenols and in the presence of certain catalysts to produce chlor derivatives of hydrocarbons or the sulfonyl chlorides of hydrocarbons.

Thionyl Chloride $SOCl_2$, available in a high degree of purity is a popular chlorinating agent because by-products of its reactions are sulfur dioxide and hydrogen chloride, gases readily removed by heating. It reacts with organic acids to form either acid chlorides or anhydrides depending upon ratio of acid to Thionyl Chloride.

Sulfur Dichloride, SCl_2, is used as a chlorinating agent and in these reactions may be considered the equivalent of chlorine dissolved in sulfur monochloride. It reacts with sodium salts of organic acids to produce acid anhydrides.

Sulfur Monochloride, S_2Cl_2, and ***Sulfur Dichloride,*** SCl_2, are used in metallurgy to chloridize sulfide ores. They react with unsaturated hydrocarbons introducing sulfur or chlorine, or both into the molecule. Unsaturated fatty acids are treated with these chlorides to produce cutting oil bases. They also find extensive use in the manufacture of dye intermediates, rubber substitutes, military gases, insecticides, and pharmaceuticals. The sulfur chlorides which have a ready source of chlorine are ideal chlorinating agents with the added advantages of ease of handling and storage and of low cost.

Phosgene (Carbonyl Chloride), $COCl_2$, is the acid chloride of carbonic acid. With alcohols it forms either chlorformates or carbonates. With amines it forms chloramides, substituted ureas or isocyanates. It enters into many Friedel-Crafts syntheses to produce aromatic acids or ketones. It may also act as an agent for direct chlorination. With metallic oxides and sulfides, it gives anhydrous chlorides. Reacting with organic acids it has been used to make acid chlorides and anhydrides.

Bulletin No. 328A, a technical discussion on Hooker Chlorinating Agents gives more information on these chlorides and is available upon request. Our technical staff is also at your service in helping to solve problems involving the introduction of chlorine into organic chemicals or in the application of any of the many Hooker chemicals.

PHYSICAL DATA

	Sulfuryl Chloride	Thionyl Chloride	Sulfur Dichloride	Sulfur Monochloride	Phosgene
Formula	SO_2Cl_2	$SOCl_2$	SCl_2	S_2Cl_2	$COCl_2$
Molecular Weight	135	119	103	135	98.9
Description	Light yellow liquid	Pale yellow to red liquid	Dark brown or reddish liquid	Yellow to slightly reddish liquid	Colorless gas or light yellow liquid under pressure
Freezing Point	Below–54°C	Below–75°C	–78°C	–80°C	–126°C
Boiling Point or Range	68° to 70°C	Technical Grade 72° to 79°C Refined Grade 75° to 78°C	Decomposes above 40°C	138°C	8.2°C
Specific Gravity at 15.5°C	1.667 ±.005	1.640 ±.005	1.638 ±.005	1.690 ±.005	1.392
Analysis	Over 99% by weight SO_2Cl_2	Technical Grade 93.0% by wt. $SOCl_2$ Refined Grade 96.0% by wt. $SOCl_2$	Minimum Cl_2 by wt. 66%	Minimum Cl_2 by wt. 50%	Shows no free Cl_2 when bubbled for one minute thru 0.1% K. I. Solution

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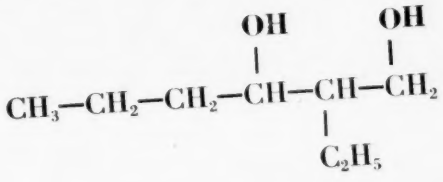
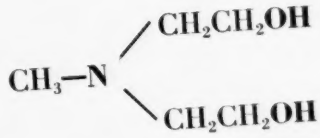
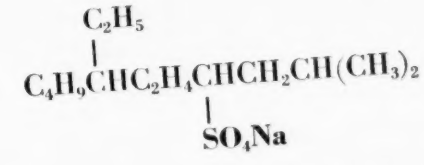


The Army's insect repellent is based on Ethylhexanediol—Carbide's new glycol. This high-boiling (243°C.), non-volatile, colorless glycol is the basic ingredient of National Carbon Company's Eveready insect repellent 612. Ethylhexanediol is also a promising intermediate for making perfume fixatives, plasticizers, and synthetic resins, particularly because its derivatives are less soluble in water and more soluble in oil than those made from the lower glycols. It has probable applications in the cosmetic field since it resembles glycerin in its softening action on the skin. Except for use in insect repellents, it will probably be available only in research quantities for the duration of the war.



Methyldiethanolamine is a new amine intermediate. If you are interested in textile auxiliaries... pharmaceuticals... insecticides... emulsifying agents... or corrosion inhibitors, and if you are looking for an amine with different structure or properties, you should investigate Methyldiethanolamine. It is miscible with water and benzene, boils at 121°C. at 4 mm., and has an equivalent weight of 119. It shows some evidence of selective action in the absorption of acid gases. Methyldiethanolamine can be supplied in drum-lot quantities.



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For further information, write for the data sheets on Ethylhexanediol, Methyldiethanolamine, and Tergitol Penetrant 4 Paste.

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The technique of manufacturing stoneware makes the construction of complex shapes an inexpensive process. Further saving by the use of chemical stoneware come from low amortization due to long life, elimination of costly breakdowns and avoidance of corrosion caused accidents. These advantages give process equipment which is not only economical in first cost but inexpensive to operate.

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THE GLASS AIRPLANE may well become a reality. Glass, spun into very fine fibers, has been combined with materials such as the Columbia Allymers to produce an airplane fuselage which has already passed service tests. This reinforced glass is so strong that, when forced against a section of a light metal alloy of identical size and form, it remains sound while bending the alloy out of shape. The Allymer-glass combination is not permanently affected, despite the fact that it is lighter in weight than the alloy.

COLUMBIA TANK CARS developed for the transportation of 73% Caustic Soda liquor have been of especial value to wartime railroad traffic. Approximately 60% greater tonnage of Caustic Soda can be delivered per tank car trip than could previously be handled in shipping the 50% strength liquor. Three of these new Columbia cars deliver the same tonnage at 73% concentration as did five cars of the 50% liquor. And in addition to tank car use, there has been a corresponding saving in railroad motive power, and in the handling, switching and spotting of a lesser number of tank cars.

BATTLES have been lost for the lack of pure drinking water . . . and Calcium Hypochlorite is playing an important part in safeguarding our armies' water supplies. One of the principal methods used at the front is the Lyster bag. Filled with locally obtained water, enough hypochlorite capsules are added to produce a safe chlorine residual. To the civilian the taste might be repulsive, but to the thirsty, battle-weary soldier it's nectar!

SILENE EF is the Columbia pigment which is apparently the nearest approach to a "white carbon black"—for years the dream of rubber compounders and pigment experts. Silene EF is at present used chiefly in critical items such as inner tubes . . . colored abrasion goods . . . products requiring high tear-resistance . . . and many molded items. It offers interesting possibilities, too, for products outside the rubber industry. Data on Silene EF and samples are available for experimental purposes, free of charge.

COLUMBIA CHEMICALS include Soda Ash, Caustic Soda, Sodium Bicarbonate, Liquid Chlorine, Silene EF (Hydrated Calcium Silicate) Calcium Chloride, Soda Briquettes, Modified Sodas, Caustic Ash, Phosflake, Calcene T (Precipitated Calcium Carbonate) and Calcium Hypochlorite

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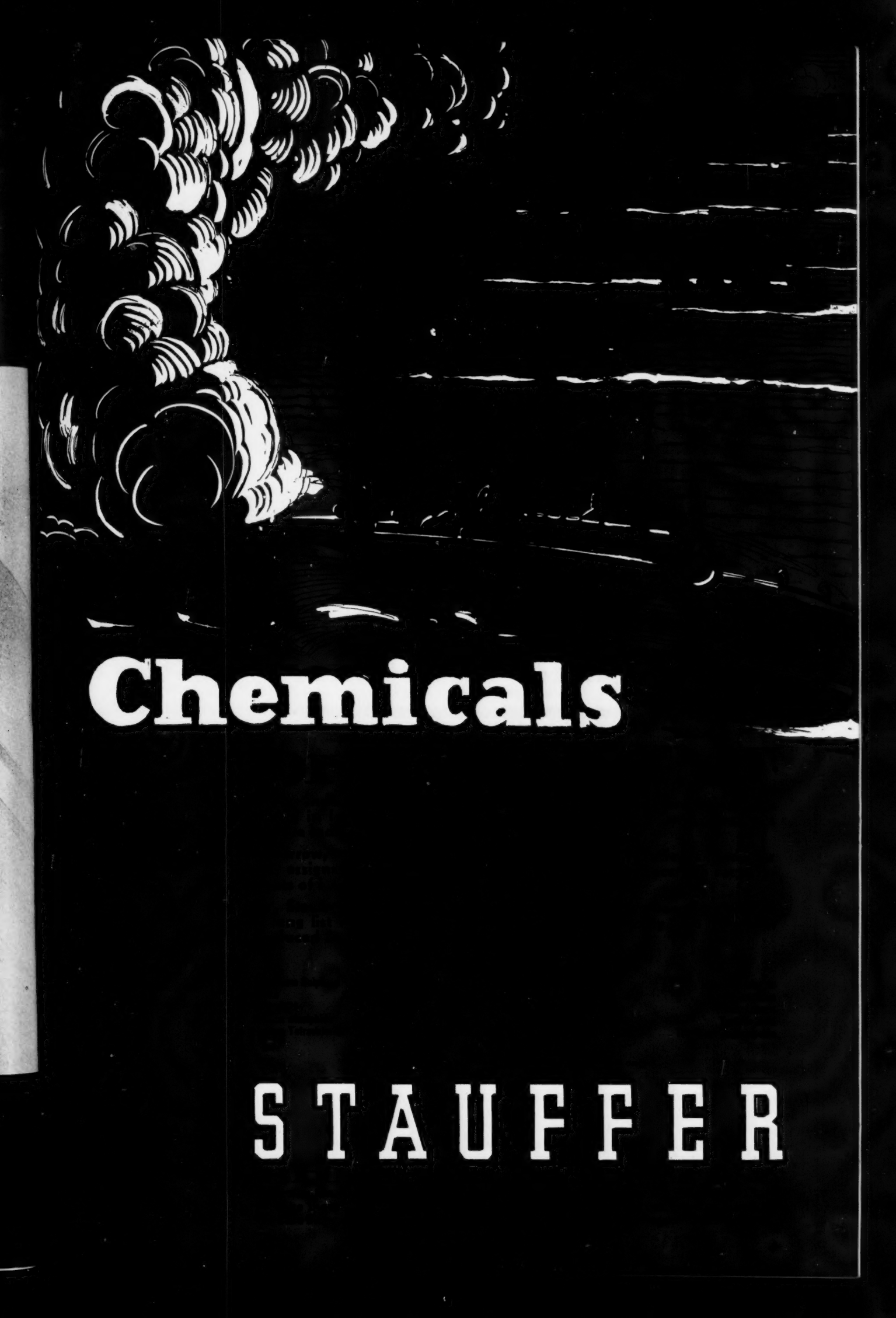
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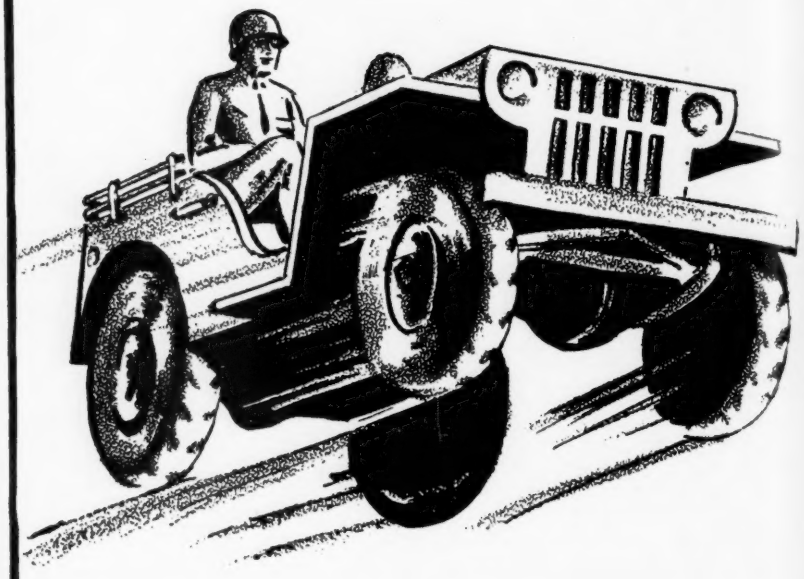

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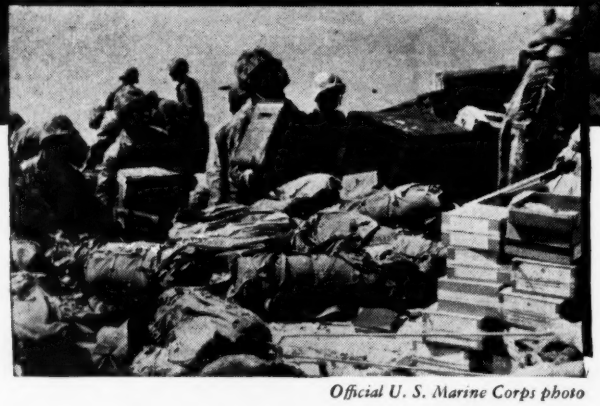

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Chemical Industries

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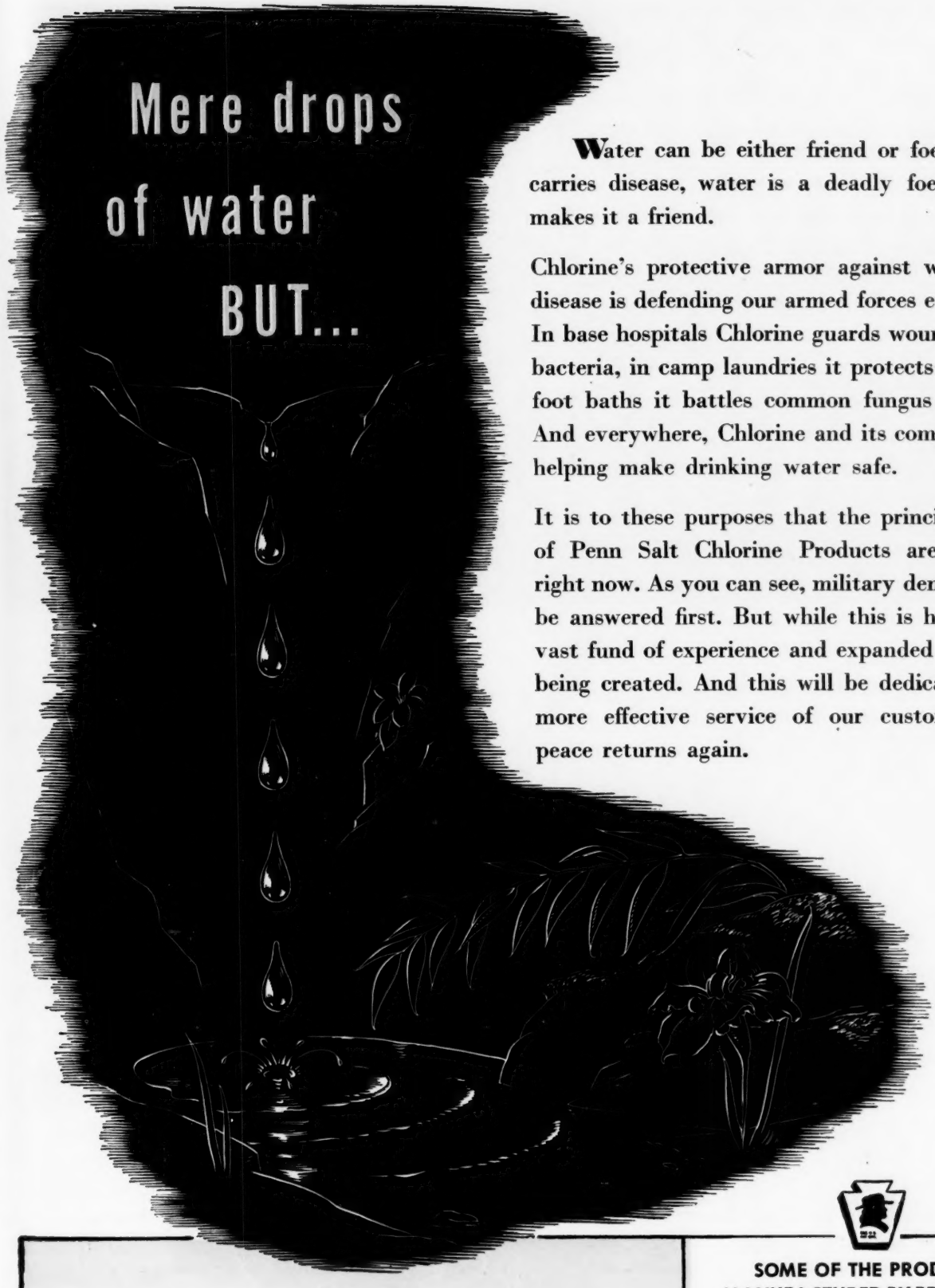

Water can be either friend or foe. When it carries disease, water is a deadly foe. Chlorine makes it a friend.

Chlorine's protective armor against water-borne disease is defending our armed forces everywhere. In base hospitals Chlorine guards wounds against bacteria, in camp laundries it protects clothes, in foot baths it battles common fungus infections. And everywhere, Chlorine and its compounds are helping make drinking water safe.

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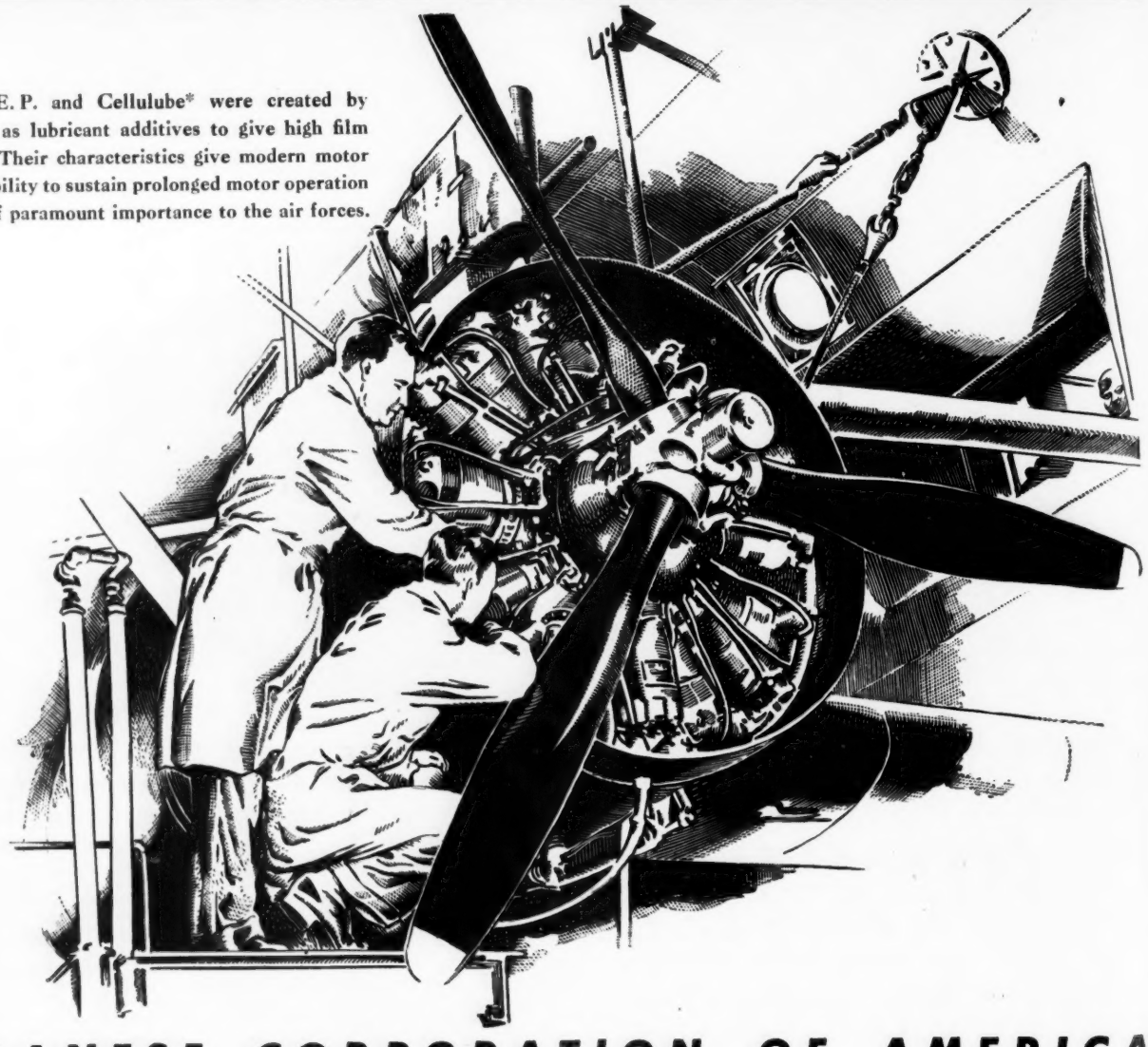
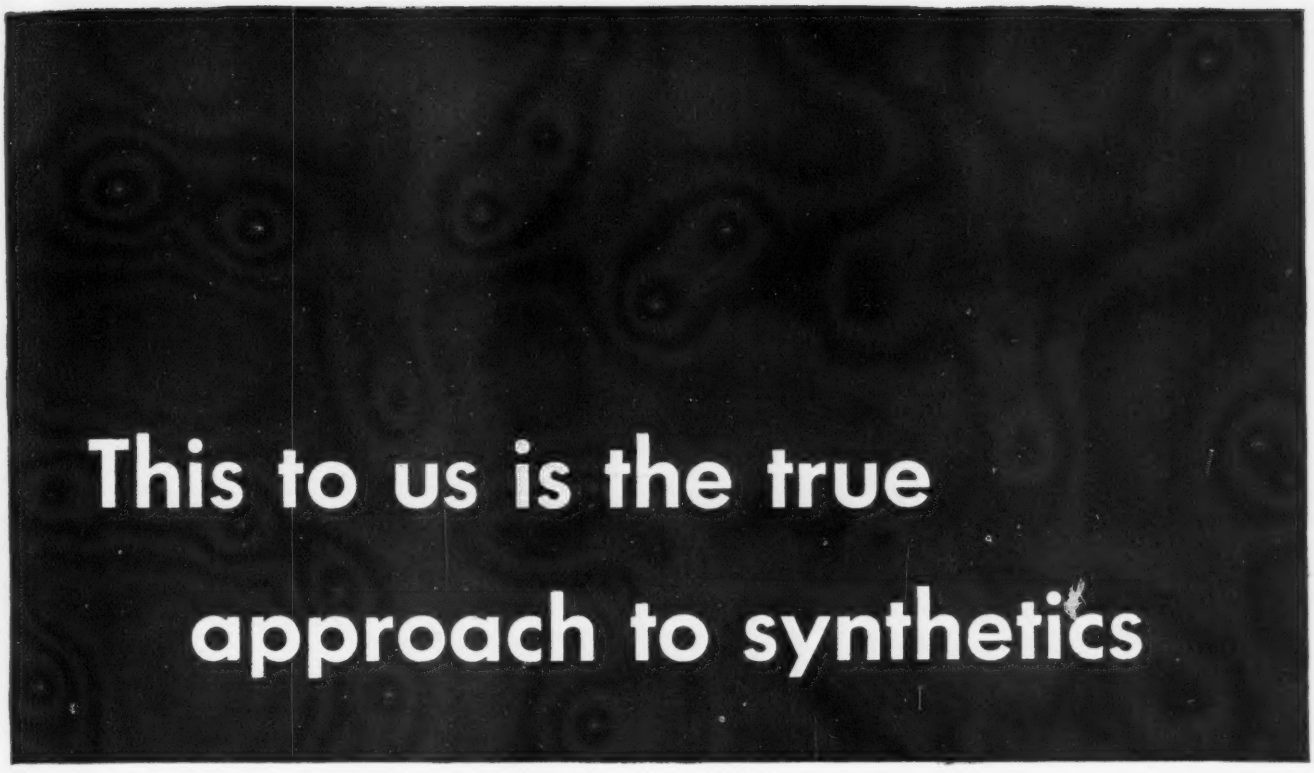


CELANESE CORPORATION OF AMERICA



AS AN ILLUSTRATION, consider Organic Phosphates. Celanese has produced literally dozens of variations in these familiar materials, since the origination of Lindol* by Celanese chemists. And each variation met a definite objective—to accentuate or to add a particular property desired by customers.

The results have ranged from improved electrical characteristics to the development of Lindol M.P., an ortho-free organic phosphate. Other properties, such as a wide range of solubility and specific gravity, higher viscosity, stability and non-flammability, have also been precisely controlled.

Today, Celanese organic phosphates—known under the trade names, "Lindol*," "Celluflex*" and "Cellulube*"—are materials permitting a wide range of physical and chemical advantages. New possibilities are being constantly developed.

Lindol typifies the Celanese method of operation. Celanese preaches and practices *flexible* research. It believes in fitting the product to a given manufacturer's needs rather than adjusting the needs to a given product. To us it is the true approach to the entire science of synthetics —to consider no formula set . . . no material perfected beyond improvement . . . no specification cut and dried.

The manufacturer, making Celanese a major source of supply for chemicals, has an advantage that has proved its worth many times over: not only extensive production facilities which are being further expanded for new products, but a research attitude that assures the efficiencies synthetics are so capable of giving . . . the last full measure of precision and value. *Celanese Chemical Corporation*, a division of Celanese Corporation of America, 180 Madison Avenue, New York 16, N. Y.

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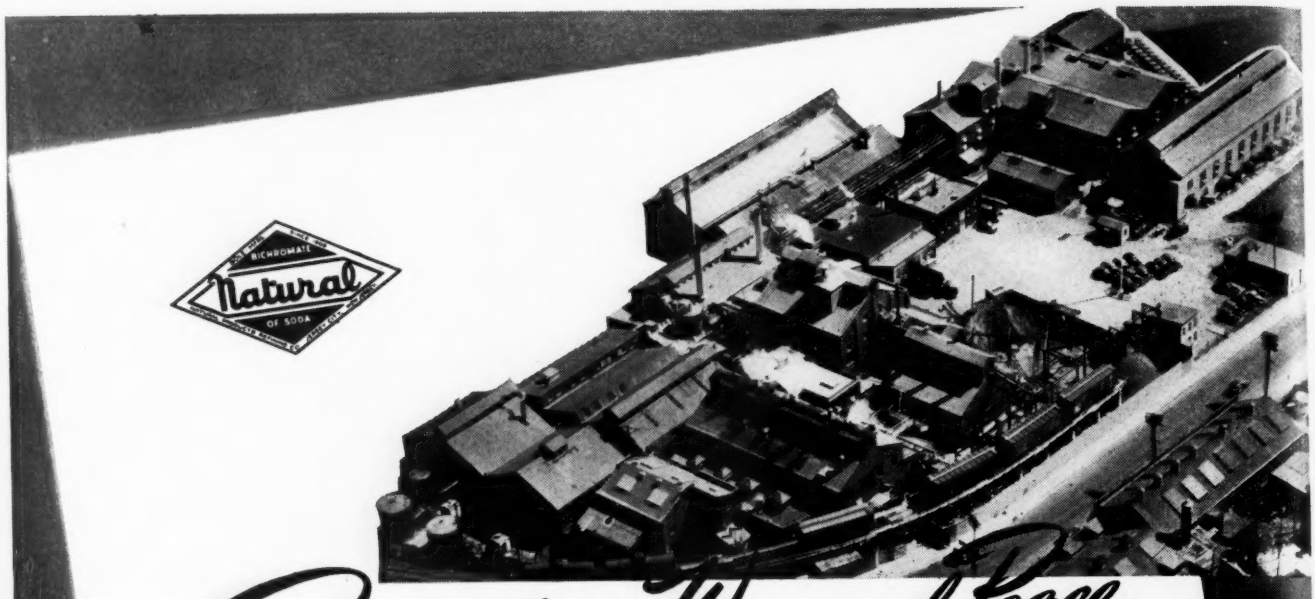

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"BUY CROW-MATES"

"... of Maximum Usefulness"

Editorial

by **ROBERT L. TAYLOR, editor**

SECRETARY OF COMMERCE JESSE JONES has recently announced that the Department of Commerce is planning to reestablish the full prewar flow—and more—of statistical information to business and industry just as soon as requirements for military security will permit.

This is good news, especially to market researchers and others in the chemical industry whose principal worries are *of* the future but *in* the present. The more good statistics we can have *soon*, the better. The reconversion bogey is not made of straw, nor are the problems that will attend the shifting of markets from war to peace. Statistics—the *right* statistics and *good* statistics—will be important tools that can make the job vastly easier if they are available.

FROM THE LOOKS OF THE PROGRAM announced by Secretary Jones, a comprehensive job is being laid out.

From an immediate standpoint, the announcement states, the Department of Commerce is cooperating with the war agencies, particularly the War Production Board, in analyzing and sifting the large body of wartime administrative and statistical data with a view to extracting and releasing as much of it as appears useful to business and industry. Some of this for the chemical industry is already coming through.

Over the longer range, the biennial Census of Manufactures, the Census of Business, and Mineral Industries Yearbook, will be resumed beginning in 1946 for the calendar year 1945. A sample survey of wartime population shifts is also planned.

For both the short and long term, the Department states that it is developing a current statistics program to provide information needed on current changes in industrial operations.

AS FAR AS CAN BE DETERMINED from so general an outline plus a few additional details given in the original announcement, the Commerce Department is off to a well-conceived start toward its stated goal of a "statistical program of maximum usefulness."

One important thing must be kept in mind, however, especially by members of industry, if this commendable and needed goal is going to be reached in fact. That is that the responsibility for reaching it must be shared by industry itself.

The job of getting better industrial statistics is a big one. It is too big to be carried by any statistics gathering agency alone.

Two of the three primary requirements for useful statistics are that they be the *right* statistics—the ones that are really needed—and that they be *accurate*. Fulfillment of both of these demands the full cooperation of the people who use statistics and the people who provide the original data for them—in both cases industry. The third requirement is speed in dissemination of statistics after the original data has been collected. This is principally the responsibility of the statistical agency.

The Department of Commerce realized the importance of cooperation from the members of industry when it set up its program. In one of the sections it states that "during the developmental stages of the program, individuals from the business community and from government will be called upon to advise with our commodity specialists regarding technical problems. When these technical problems are out of the way and individual programs begin to take shape, opinions and suggestions of those concerned or interested in the program will be solicited, both from individuals and from trade organizations."

IT IS NOW UP TO THE MEMBERS OF INDUSTRY—the chemical industry in the case of chemical statistics—to take full advantage of the opportunity confronting them. Those individuals, companies and trade groups who are called upon for advice and consultation by the Department of Commerce should give it willingly and as extensively as time permits. Others who may not be called upon but who have constructive suggestions owe it to the job to be done to place them before the proper persons in the Department. The investment in time and effort will be returned manyfold if it results in but a small improvement in the usefulness of chemical statistics.

Reliable statistics on national resources and production and consumption of goods, freely distributed, are as necessary a part of the democratic system of free enterprise as are free speech and a free press. Industry now has a golden opportunity to see that its principal source of statistics is put back into operation in a state "of maximum usefulness."

The Anglo-American Oil Agreement

AFTER TWO YEARS OF NEGOTIATION the United States and Great Britain have finally reached an accord in the development and distribution of their petroleum resources in international trade. It is their hope that eventually the pact will be extended to all oil-producing countries throughout the world.

The agreement is significant to chemical industry because it is the first attempt, under the international collaboration policy set forth in the Atlantic Charter, to further the enjoyment by all nations of access on equal terms to the trade and raw materials of the world. If the oil arrangement is successful, it is possible and likely that the principle may be extended to other important commodities where the world supply is limited or in the hands of only a few nations, such as phosphate rock, for example, and tin, nickel, chrome, tungsten, and some other ores.

The specific aim of the petroleum agreement is, first, to bring production of crude oil by individual countries more in line with the proven reserves of those countries, and secondly, to provide all countries of the world with enough oil for their essential needs.

The administration of the agreement and the problem of working out details and methods are in the hands of an International Petroleum Commission. Already a dispute has arisen between adherents of two opposing concepts of international control as to whether only minimum requirements for production and consumption by countries shall be established, allowing operations in excess of these minimums to be governed by the free economic forces of supply and demand, or whether maximum limits should also be set, by countries, for both production and consumption.

This is a very important and fundamental point, and there are powerful arguments on both sides. It is a point that will probably come up in all subsequent international raw material agreements, regardless of the commodity involved, and the disposition of the present dispute will thus set an important precedent.

Basically, the question is one of whether the material welfare of the world can be improved more by artificial restrictions on the production and consumption of raw materials or by letting natural economic laws control after minimum requirements are provided for. We do not believe it was intended that the oil agreement should be a state-controlled international cartel, which it will be if the view of artificial restriction prevails. If private cartels do not operate in the best interests of the public, neither do cartels operated by governments. Advancing technology and other fruits of competition have shown themselves far better custodians of the wealth of the world than any restrictive legislation.

If the oil agreement means more equitable distribution of world petroleum resources, it is good, and extension of the same system to certain other commodities should operate for the benefit of all. If it is an attempt at absolute control of production and consumption it will simply be getting rid of one evil and replacing it with another worse than the first.

Well Done and Thanks

SO MUCH HAS TRANSPIRED that it seems relatively long ago that the nation was shocked by the Baruch rubber report statement, "Of all critical and strategic materials rubber is the one which presents the greatest threat to the safety of our nation and the success of the allied cause. If we fail to secure quickly a large new rubber supply our war effort and our domestic economy both will collapse."

Actually this statement was made in September, 1942, not yet two years ago. In that short time a miracle of chemistry and engineering has been performed. We are producing synthetic rubber at the rate of 836,000 long tons annually, compared with prewar crude rubber imports of about 600,000 tons.

Thus it was with great pride in the chemical and allied industries that we read Rubber Director Bradley Dewey's special report in which he stated that the job of making this country independent of foreign rubber had been accomplished. Along with his report Mr. Dewey resigned and recommended that the Office of Rubber Director be abolished, as its functions can now best be administered by other government agencies with the help and advice of industry advisory committees.

We second the sentiment in Bernard Baruch's comment that Colonel Dewey and William M. Jeffers, his predecessor, have carried their part of the rubber program to success.

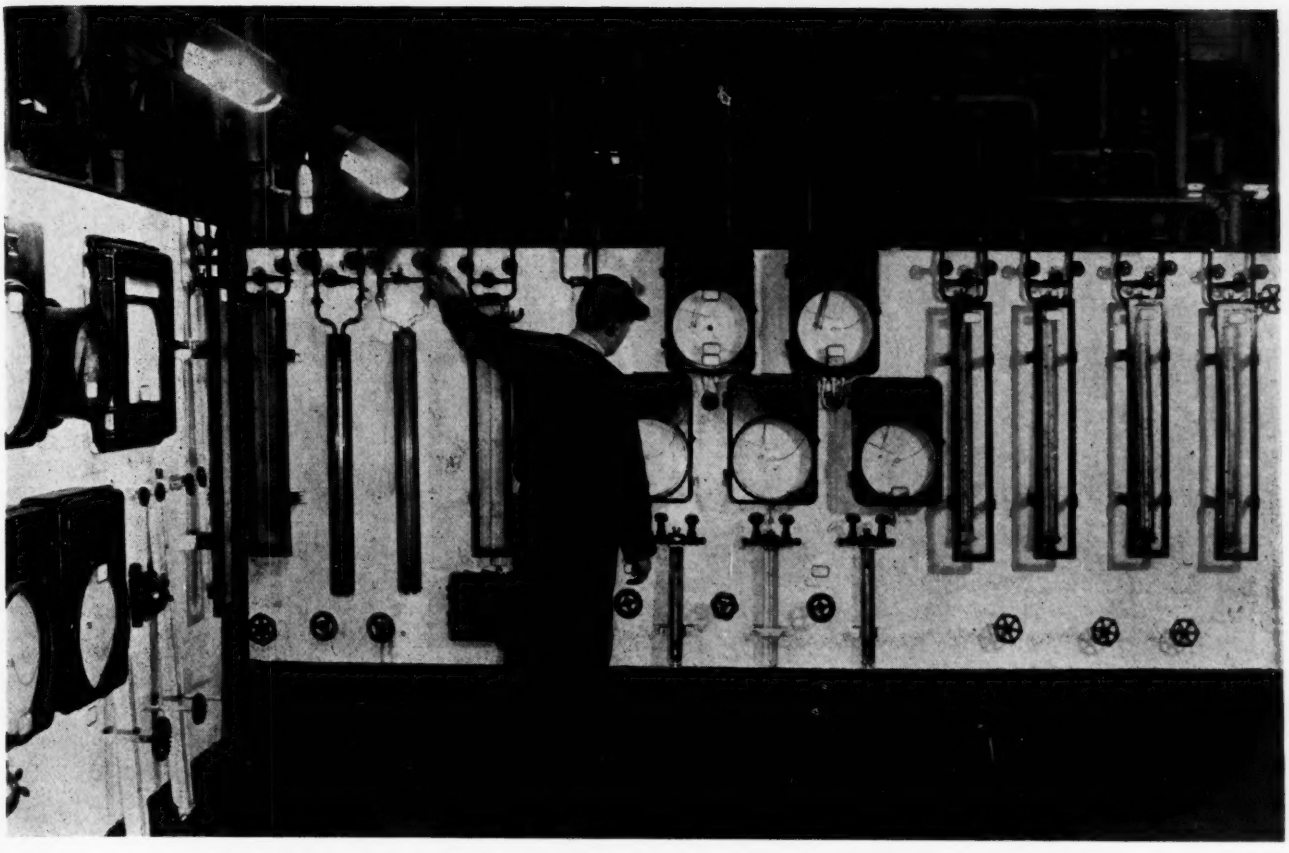
However we would like to go further and pay tribute to this country's chemists, engineers and other technical men who, with their unbeatable technical knowledge and skill, were the real miracle workers in the rubber program. Although they are not on the firing line they have contributed heavily to the approaching day of victory.

Hiatus of Technical Personnel

THE SITUATION WITH REGARD TO COLLEGE enrollments of chemistry and chemical engineering students has reached the point, as was predicted on this page some time ago, where it hardly pays to conduct classes or maintain laboratories. The only exception is metropolitan area schools with heavy night school enrollments.

One large eastern school reports that it now has three male seniors in chemistry and chemical engineering as against 71 six months ago. Freshmen, sophomores and juniors, most of whom are under eighteen, number 78 as against 183 in January. Female enrollment in these courses is also dropping off markedly, the total for all four classes plus graduate students being 32 in August as against 70 in January.

If the chemical industry isn't in for some mighty lean years as far as technical personnel is concerned, we miss our guess.



The control panel in the methylamine plant of the Rohm & Haas Co. at Bridesburg, Pa. Here, through a process of catalytic dehydration, methanol and ammonia are converted to methylamines.

The Chemistry and Uses of METHYLAMINES

by DR. E. H. RIDDLE, Rohm & Haas Company

NEW CHEMICALS

FIRST FOUND USEFUL for unhairing of skins by a researcher in the leather industry a few years ago, methylamine compounds have become important industrial chemicals serving several industries among which are textiles, insecticides and disinfectants, explosives, rubber, leather, photographic chemicals and others. In this article Dr. Riddle describes the development of the methylamines, their manufacture and uses .

ALTHOUGH KNOWN for many years as laboratory chemicals, the methylamines have been available commercially only within the past decade. The impetus for the development of their manufacture resulted from the important discovery in 1927 by Dr. McLaughlin and his associates in the Tanners' Council Research Laboratory in Cincinnati that methylamines have a powerful accelerating effect upon the unhairing of skins. With this application as an incentive, several chemical companies began to investigate methods for manufacturing methylamines. The Rohm & Haas Company started a research program on methylamines in 1929 under the direction of C. E. Andrews, now manager of the Bridesburg, Penna., plant. A large part of the investigation was carried out by Dr. L. U. Spence, now in charge of catalytic research in the Rohm & Haas Research Laboratory. By 1931 the laboratory work on the methylamines appeared sufficiently promising to warrant construction of a pilot plant. On the basis of information obtained in this pilot unit, a full-scale plant was designed and was placed in operation in 1934.

The procedure developed for the manufacture of the methylamines involves the

catalytic dehydration of methanol and ammonia. In this process, anhydrous methanol and ammonia are vaporized, mixed in the desired proportion (the exact ratio depending upon the ratio of mono and di to be produced), preheated and passed over a dehydrating catalyst[1]. The reaction is carried out in a multitubular converter using molten salt for temperature control. The ammonia and methanol first form monomethylamine, which then resets further with additional methanol to produce di- and trimethylamine. This series of reactions is exorthermic and the heat evolved must be dissipated as the reaction proceeds over the catalyst.

The product from the converter contains a mixture of the three methylamines with ammonia and water. Since the methylamines are gases at atmospheric temperature and pressure and have very close boiling points (a spread of only 12.5° C.), the separation of this mixture posed one of the most difficult problems in the methylamine development, a problem further complicated by the fact that trimethylamine forms a constant boiling mixture with ammonia, mono- and dimethylamine. The problem of separation was finally solved satisfactorily by the use of a combination of selective absorption in water and fractionation under pressure.[2]

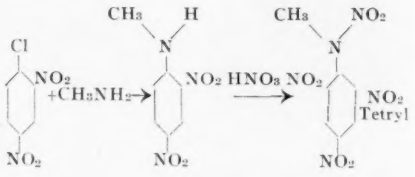
In addition to varying the ratio of methanol and ammonia in order to attain the desired ratio of methylamines, it is customary to recycle monomethylamine when a high ratio of di- to monomethylamine is required. In this way the proportion of trimethylamine, for which no substantial outlets have been developed, is not increased appreciably. The trimethylamine that is formed may be burned for fuel or may be reverted to mono- and dimethylamine by passing over a catalyst with ammonia and steam.[3]

All equipment in the methylamine plant is constructed of iron, and automatic controls are used to maintain the required temperatures and pressures throughout the entire system of converters, columns and stills. The analysis of the relatively pure trimethylamine removed overhead from the water scrubber is carried out automatically by passing a sample of the gas into water and determining the electrical conductivity with a calibrated recording instrument which immediately reveals the purity of the trimethylamine.[4]

It is often stated in the chemical industry that a period of about ten years is usually required to establish a new product, from the time research is started to the day when the product can be considered as established. The development of Rohm & Haas methylamines did not deviate far from this time schedule. In his well-known "encyclopedia" of organic chemistry, published in 1937, Dr. F. C. Whitmore of Pennsylvania State College stated, "Although the methylamines are readily available, adequate uses have not yet been found for them." However, by 1941 the demand for methylamines exceeded production capacity and consequently the Rohm & Haas plant was expanded to approximately double its original capacity. In spite of this expansion, it became necessary early this year to place the distribution of methylamines under War Production Board directive (through the methanol order M-10) in order to assure sufficient material for the most important applications. Beginning in the fourth quarter of 1944, the methylamines will be formally allocated under the general chemical order, M-300.

Derivatives

The methylamine derivative making the most significant contribution to the war effort is tetryl, correctly named 2,4,6-trinitrophenylmethyl nitramine, but more often referred to as tetranitromethyl aniline. This compound was first described in the chemical literature in 1879, and has been traditionally manufactured by nitration of dimethylaniline, a reaction in which one of the N-ethyl groups is replaced with a nitro group. However, in 1938 a French journal reported a new method of manufacture based on the reaction between monomethylamine and 2,4-dinitrochlorobenzene, an important intermediate in the dyestuffs industry.



In 1941, this "French" method using monomethylamine was adopted by U. S. plants making tetryl for British contracts and for Lend-Lease. This demand for monomethylamine was an important factor in the expansion of the Rohm & Hass plant.

Tetryl is more powerful an explosive and is more heat-stable than TNT or picric acid. On the other hand, tetryl is considerably more sensitive to mechanical shock. For this reason, it is the favorite explosive for use in boosters. TNT or a similar high explosive in a shell is normally exploded by a fuse in which a detonator, such as lead azide or mercury fulminate, sets off a larger charge of a booster such as tetryl, which finally starts the main charge of TNT or other high explosive on its path of destruction. In a similar manner, tetryl

Methylamines are potent accelerators for unhairing skins, a discovery which led to large-scale production for many other uses.

has been used extensively in commercial explosives as a base charge for blasting caps.

Rubber Accelerators

The discovery by Oenslager of Diamond Rubber Company in 1906 that aniline accelerates the vulcanization of crude rubber is now considered as important a milestone in the history of rubber as Goodyear's discovery of vulcanization itself in 1839. Oenslager's discovery was followed by extensive research to find new and better organic accelerators and we now have five major chemical types: aldehyde-amines, guanidines, thiazoles, dithiocarbamates, and thiuram sulfides. Important representatives of the last two classes are commercially manufactured from dimethylamine through its reaction with carbon disulfide in the presence of alkali:

$$(CH_3)_2NH + CS_2 + NaOH \longrightarrow (CH_3)_2NCS_2Na + H_2O$$

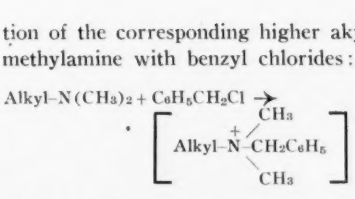
Treatment of this product, sodium dimethyldithiocarbamate, with zinc chloride converts it to the corresponding zinc salt, $((CH_3)_2NCS_2)_2Zn$, sold to the rubber industry under the trade name Methyl Zimate and Methasan. Oxidation of the dithiocarbamate by a variety of methods results in formation of a thiuram disulfide, tetramethylthiuram disulfide. This compound is familiarly known as Tuads and Thiurad:

$$2\ (CH_3)_2NCS_2Na \longrightarrow (CH_3)_2NCS\text{–}SS\text{–}SCN(CH_3)_2$$

Further treatment of this disulfide with either sodium cyanide or cyanogen chloride (CNCl) removes one sulfur atom to give the monosulfide, $(CH_3)_2NCS—S—SCN(CH_3)_2$. Thionex and Monex are trade names for this tetrameythlthiuram monosulfide. All of these dimethylamine derivatives are extremely active in the vulcanization process and are known as ultra accelerators. Such accelerators can be used in all grades of synthetic and natural rubber when a fast permanent cure is required.

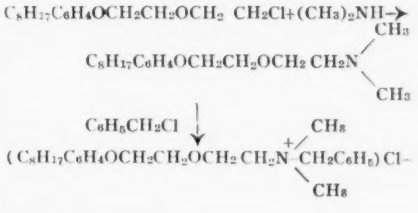
Quaternary Ammonium Halides

An important type of methylamine derivative in the industrial field today is the high molecular weight quaternary ammonium halide. Investigations on the surface active properties of these amine salts were carried out by Dr. I. C. Somerville in the Rohm & Haas Research Laboratory shortly before the beginning of the methylamine development. As an outcome of this basic research, the Rohm & Haas Company introduced in later years Triton K-60, a long-chain alkyl benzyl dimethylammonium chloride, for use as a softening and finishing agent for textiles. This type of product is manufactured by reaction of the corresponding higher akyl dimethylamine with benzyl chlorides:



The akyl dimethylamine may be produced by reaction of dimethylamine with an alkyl amine or alcohol, the choice depending upon price, availability and comparatives yields. Cation active materials of this kind have an affinity for cellulose which results in a permanent action, and they are recommended as softeners and lubricants for all types of fabrics where extreme softness without oiliness is desired.

Reports of the germicidal and bactericidal properties of these long-chain alkyl benzyl dimethylammonium salts first came from G. Domagk in Germany in 1935, and at the present time there is considerable interest in the quaternary type of compound among the manufacturers of germicides, antiseptics and related products. It was the opinion of Dr. H. A. Bruson of the Rohm & Hass research staff that the experience of this company in the quaternary ammonium field could be utilized to good advantage in the discovery of more active germicidal salts. Accordingly a large number of variously substituted quaternary ammonium chlorides were prepared under Dr. Bruson's direction and were evaluated in the laboratory of Parke, Davis & Company. The most potent compound found in this investigation has the longwinded chemical name *para*-diisobutylphenoxyethoxyethyl benzyl diethylammonium chloride and is manufactured by a series of reactions from petroleum and coal tar derivatives. The final steps involve reaction of dimethylamine with a chloride to form a tertiary amine, from which the quaternary ammonium chloride is obtained by reaction with benzyl chloride.



This compound is now sold by the Rohm & Haas Company under the trade name Hyamine 1622 (Hyamine 10-X is a very closely allied compound which cannot be manufactured at the present time because of raw material restrictions). These products are characterized by high bactericidal activity, relatively low toxicity, absence of any appreciable odor, and stability on prolonged storage. At the present time, practically the entire output of

Methylamines are used in the manufacture of tetryl, an important "booster" charge for setting off the charge in projectiles.

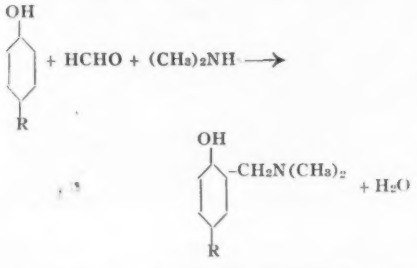
Hyamine 1622 is going to the Navy for use in all parts of the world as a general disinfectant and germicide.

Another textile chemical produced from a methylamine is Igepon T. The intermediate for this product is manufactured from monomethylamine by reaction with ethyl alcohol and sulfur trioxide (the "anhydride" of sulfuric acid):

$$CH_3NH_2 + CH_3CH_2OH + SO_3 \longrightarrow CH_3NHCH_2CH_2SO_3H + H_2O$$

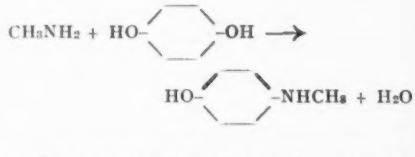
Reaction of this aminosulfonic acid with stearic acid forms the corresponding amide. Igepon T is a well-known synthetic detergent for use as a wetting, penetrating and dispersing agent in the textile, leather, and other industries.

Investigations carried out in the Rohm & Haas Research Laboratory by Dr. H. A. Bruson and his associates have revealed that tertiary amines may be obtained by reaction of dimethylamine and formaldehyde with a phenolic compound:



Hyamine B, one of the compounds produced by this type of reaction, is sold by the Rohm & Haas Company for use as an anti-rust, anti-corrosion and neutralizing agent in the preparation of Army Ordnance Preservative Engine Oil (Specification AN-VV-C-576, Amendment 1). These oils are used to protect engines and engine parts during shipment or during the periods either prior to or after a general overhauling. In meeting the requirements of the above specifications, Hyamine B must pass extremely rigid performance tests.

One of the most universally used organic reducing agents for photographic developers is commonly known as Metol or Elon and is produced by reaction of monomethylamine with hydroquinone, itself a component of most developing formulas:



With the extent to which both movie and still photography are being used by the armed services, Metol and Elon are rendering an important contribution to allied victories.

A recent development of the Resinous Products & Chemical Company is the field of amide plasticizers, exemplified by Plasticizer 35. This product is a dimethylamide of a synthetic fatty acid which is similar to stearic acid in its general properties. However, Plasticizer 35 is appreciably superior to the corresponding dimethyl stearamide. It is a particularly effective plasticizer for polyvinyl butyral, combining efficient plasticizing action, excellent permanence at high temperatures, and low cost. Newer developments, such as Plasticizer 36, are indicative of the results of continuing research in the field of dimethyl amide plasticizers.

It will be recalled that the development of methylamines by the Rohm & Haas Company followed the discovery of their value in the unhairing of skins and hides in the manufacture of leather. Further investigation in the Rohm & Haas Research Laboratory by Dr. H. G. Turley and his associates indicated that dimethylamine was the most active of the three methylamines for this application. The use of dimethylamine (supplied in the form of the sulfate salt) as an accelerator for unhairing with lime has steadily expanded since its introduction. Compared with other types of accelerators such as sulfides, dimethylamine sulfate has a very mild action on the hair, and is therefore particularly suitable for use when the tanner wishes to save the hair. In addition, the cleanliness and relatively lower swelling of the hides is of value in the production of an exceptionally fine-grained leather.

The applications of methylamines described in this article indicate many of the wide variety of fields to which they are contributing. Examples of additional industrial outlets include the use of monomethylamine in manufacturing certain vat dyes and in the production of a variety of pharmaceutical products, such as Theobromine. Many other reactions and applications are described in the technical and patent literature. Some of these are in the embryonic stage at the present time and can be expected to reach industrial maturity in the post-war years.

Patent References

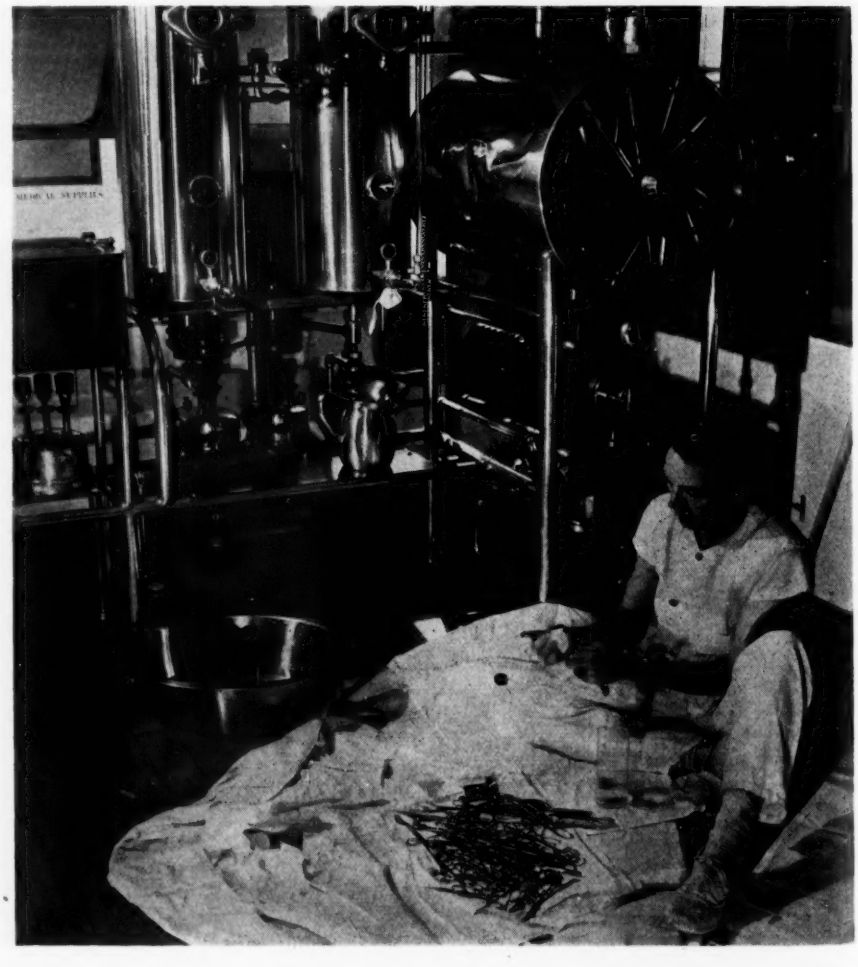
(1) U. S. 2,073,671 (1937)

(2) U. S. 2,061,889 (1936)
U. S. 2,119,474 (1938)
U. S. 2,125,905 (1938)
U. S. 2,126,600 (1938)
U. S. 2,206,584 (1940)
U. S. 2,206,585 (1940)

(3) U. S. 2,171,809 (1939)

(4) U. S. 2,095,786 (1937)

Hyamine or phemerol, tradenames for a long-chain alkyl benzyl dimethyl-ammonium salt, is used for the sterilization of surgical instruments.



The Chemical Industry and RECONVERSION

by T. N. SANDIFER, Chemical Industries' Washington Correspondent

WHAT IS GOING TO HAPPEN to the 100 per cent wartime increase in chemicals and allied products production when Army and Navy requirements begin to fall off is something to wonder about. Washington authorities closest to the chemicals situation are optimistic. They feel that the problem will be one of reconversion rather than curtailment.

THE DOMESTIC volume of production of basic chemicals increased 180% from 1939 to 1943, or from $790,000,000 to $2,210,000,000. The volume of compounded chemical products increased 82% during this period, and approximately 100% for all chemical and allied products.

The war program is by no means complete, but there is a growing interest in the outlook for this expanded production capacity both during the uncertain interval before the war ends and in the postwar period. With regard to some phase of this production it is possible to be fairly definite.

No let-up is in immediate prospect for explosives production. Instead, there is a pronounced upswing, marked by increased figures for T. N. T., smokeless powder, and phosphorus.

In those classes of chemicals where cutbacks in military requirements can be expected soonest, there are, in general, strong indications at this stage that civilian demand, requirements for various purposes abroad, and other uses, may well take up the slack for some time to come.

Commodity Outlooks

Fertilizer production, for illustration, faces a large demand in the heavy war food program in this country, possible requirements for re-occupied areas abroad, and for allied nations' use.

Leather is a similar case. As military demands decline, domestic and export requirements will absorb production.

The rubber program is a heavy consumer of chemicals. So is petroleum production. Both can be expected to go ahead despite other curtailments, although there probably will be some slight cutbacks in petroleum eventually.

Some cutbacks are foreseeable in drugs and pharmaceuticals, although the garrisons now abroad, and which may be stationed abroad for some time, are probably heavy consumers of this production.

Some reduction may take place in military consumption of textiles eventually, but again it may be expected to be offset to a large extent by requirements of the civilian populations at home and abroad.

As a further aspect of the reconversion problem, it is pointed out that while inevitably some plants will be shut down by the reduction in war demands, the general effect will be gradual, and not immediate. Producers' stocks are low, in some cases less than 10 to 30 days' supply on hand, and it is reasonable to expect that they will want to build up inventories. In other cases plant repairs are overdue, and where there is a let-down in war production, buildings and equipment may be restored and put back into first-class operating condition. Factors such as these will help to tide over until chemical-consuming industries such as automobiles, refrigerators, washing machines and residential housing are able to get under way.

Handling of Stockpiles

While it is true that Government stockpiles at the end of the war will include almost every raw material known to war, these stockpiles are in general limited to some 100 broad categories. When the war ends, depleted business inventories will need replenishing far beyond the point possible out of any Government surplus stocks. WPB has estimated that the entire surplus in finished goods suitable for the domestic market will be less than the equivalent of two months' prewar retail sales, as recorded by the Department of Commerce.

These stocks held by the Government are to be handled in such a way as to be the least threat to revival of normal business after the war, according to present plans. It is the expectation that aside from redistribution during the war, stockpiles will be released only gradually, not alone to safeguard the market, but because of a natural caution in the responsible agencies against a too precipitate dispersal of raw materials stocks that may have strategic value or even need.

At present there are stockpiles of, among other things, manganese, quinine, belladonna leaves, iodine, and mercury. Alcohol, glycerine, and aluminum either have been stockpiled at one time or are still being held. Restrictions on use of glycerine have been removed, and those on aluminum relaxed. Thus, from the present outlook, the huge reserves of Government materials do not change the general picture as given here.

Government Plants

Much has been heard of Government plants, and doubtless more will be heard. However, more than half the Government's expenditure for industrial expansion has been for equipment rather than structures. Not all the structures have been new; a very substantial outlay was for additions or improvements to existing facilities.

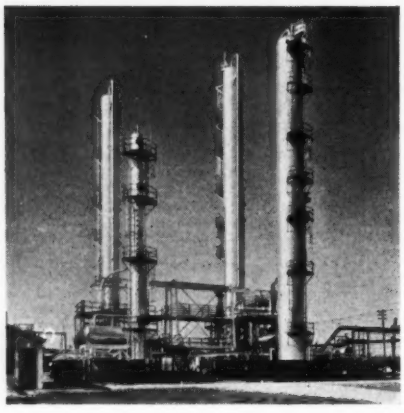
Approximately one-third of the expenditures, according to a recent WPB survey, have been in plants making explosives and ammunition. Some of these, or some parts of them, will be kept in stand-by condition according to present plans. One-third has been for chemical, rubber, metals, and machinery facilities, and the remainder, aircraft and shipping.

Army and Navy may wish to retain much of their plant investment, of which approximately $5,000,000,000 is in ordnance and shipping; plants constructed by DPC are considered readily adaptable to commercial use, but the line between those to be kept in stand-by and those to be offered for sale is hard to define today, according to that agency.

Government policy on retention of plants in stand-by for future use, or for conversion to other public use, will probably be a matter for Congress to determine.

On a broad financial basis, figures by SEC are interesting; war contractors in general at the time hostilities cease in Europe, according to this agency, may possess a net of $20 billion compared to $9 billion at the end of 1940, and this agency expects that they will be able, generally speaking, to finance a high level of postwar production.

With regard to the chemical industry in this general picture, then, the Washington authorities who are closest to the industry situation are optimistic. They feel that the problem will be one of reconversion, rather than curtailment; converting from production for war to production for civilian consumption, with its factors of back-log demand for many commodities, new items of manufacture, and inventory requirements.



INSURANCE PLANTS?

ASKED BY "CHEMICAL INDUSTRIES" to comment on Dr. D. B. Keyes' proposal* that the Government build "insurance" plants to acquire plant-scale know-how on processes economically uninteresting to industry but of possible value to the nation in an emergency, chemical leaders expressed opinions ranging all the way from unqualified approval to unqualified disapproval. In general, they expressed agreement with the basic idea but doubt as to the likelihood of its working out in practice, especially in peacetime. Here are some of the comments, along with Dr. Keyes' reply.

"We must be technologically prepared"

DR. KEYES PROPOSAL of "Insurance Plants for the Chemical Industry" contains arguments which, to me, are most convincing We all know now that we must be technologically prepared to meet any situation—be it wartime or peacetime—and we must know several methods of producing all materials for war.

Perfectly sound courses in the peacetime economics of technological production are given in our universities but I wonder if these courses should not also include wartime economics. If so, the logic of Dr. Keyes' arguments would be obvious to all.

The important point is that our alternative wartime methods of production must be now developed, designed and evaluated in the same unbiased manner in which private industry conducts its peacetime business without regard to outside political influence.

My thanks to Dr. Keyes for bringing this matter to the attention of all of us in technological work.

JOHN V. N. DORR, President
The Dorr Company

"Private industry . . . not government planners"

WITH RESPECT TO Dr. Keyes' proposal for the establishment of insurance plants for the chemical industries I would like to say that in this age of rapid changes of chemical processes and techniques it would be unwise to delegate the responsibility for national preparedness to any one group of men either in government or industry. I feel that our greatest insurance for the preservation of our country both in peace and in war lies in permitting our chemical industry to develop and expand as it wishes. I do not believe that it is possible to plan for an emergency with any high degree of accuracy. At the beginning of this war it was private industry and not the government planners who were able to meet all the major raw material shortages. Consequently, after reading over Dr. Keyes' article I just can't go along with his proposal inasmuch as the exact opposite is what we should be driving at.

WILLARD H. DOW, President
The Dow Chemical Company

"The principle is correct . . ."

IT SEEMS TO ME that Dr. Keyes' proposal deals not only with insurance plants for the chemical industry, but with insurance for the nation as a whole, enabling the government to build certain pilot or experimental plants which might be needed in an emergency or for war purposes.

I believe this principle is correct, but I doubt that the matter can be irrevocably turned over to the government, because such matters have a way of becoming political footballs and frequenty go far beyond the original plan. The Muscle Shoals venture is an example. The original plants built there were certainly not of much use for war purposes. It was a noble experiment which I think was rather costly and did not prove successful as far as our war needs are concerned.

However, it is far from my thought to condemn the whole idea. I agree with Dr. Keyes that the government should have pilot plants to develop processes needed in an emergency, that is, for war purposes, but means should be found to limit activities to just such purposes.

The development of phosphates for fertilizers at Muscle Shoals demonstrates how these projects grow. This was not a pilot plant and the claim was made that the production of phosphates was needed to prevent soil erosion. The government did compete with private industry and in a rather costly way to all of us taxpayers.

This is a matter that cannot be discussed in a few words, but I do believe that a group of technologists, representing our various technical societies, should investigate matters of this kind, without political bias, and inform the nation regarding the need for research required from the standpoint of national security and which cannot be provided for by private enterprise.

GASTON DUBOIS, Vice-President
Monsanto Chemical Company

" . . . the problem is one of best method"

THE SUGGESTION OF our fellow chemist, Dr. Keyes, in his paper "Insurance Plants for the Chemical Industry," requires more than a categorical answer. Whatever the form of government one lives under, it must protect itself from outside aggression. It owes its subjects protection. The problem is one of best method of accomplishment.

In a truly democratic government such as set up by the founders of this nation, provision has been made from time to time for service on the part of naval, army and civilian units in the establishment of scientific and technological divisions to carry out just such activity as Dr. Keyes proposes. Arsenals, proving grounds, agricultural experiment stations, scientific institutions dealing with mines,

* See "Insurance Plants for the Chemical Industry," *Chemical Industries*, June 1944, pp. 829-830. At the time this article appeared, Dr. Keyes was chief of the Chemical Division of the Office of Production Research and Development of the War Production Board. He has since been named director of OPRD, succeeding Dr. Harvey N. Davis.

Yes, but...

forestry, pest control, and a host of like activities, were established for just exactly this sort of activity. They have been manned by intelligent and skilled directors and have originated and developed many valuable projects. Their work was not always as constructive as it might have been, and we all recognize that in more recent years some crack-pot ideas and the ensuing bulletins have indicated the penetration of bureaucracy and subsequent deterioration. On the whole, however, they have given a rather high grade of service.

In addition to these Government operated laboratories with their technical staffs, we have also our National Academy of Sciences and the National Research Council. Quite recently the Army and Navy named a committee of distinguished civilians to cooperate in a plan of postwar research. Our chemical industry is well represented.

It seems to me that all the necessary elements to accomplish the purpose set forth by Dr. Keyes are already in existence. All that is needed is to put this complex machine into efficient working order and direct the combined efforts to a constructive and fruitful end.

But here is where politics enters. The unwillingness of the bureaucratic unit to coordinate and program its activity is the real problem. It is not solved by setting up still another unit.

Why could not the National Academy of Sciences, the National Research Council, or the new Army-Navy Research Committee be given authority to consider and to direct all such projects into the several existing Bureaus, all equipped with personnel and facilities? That seems to me to be a more logical method of approach. I am certainly not in favor of establishing a new unit until I am sure that those now existing are operating most effectively in the solution of national problems of this type.

W. S. Landis, Vice-President
American Cyanamid Company

"I give this weak spot greater emphasis"

I disagree with Dr. Keyes on his idea of insurance plants which was discussed in the June issue of Chemical Industries. My reason for disagreeing is one which is mentioned by Dr. Keyes himself, namely, politics. The difference between us is that I give this weak spot in his plan greater emphasis than he does.

In my opinion the trouble would arise from the need for a substantial fund in order to obtain worthwhile results. As soon as such a fund was created it would become a target for political pressure groups. In peacetime the pressure might well exceed the resisting forces.

This assumes that the administration of the fund for insurance plants would eventually fall under the control of one of the old-line agencies. However, there has been formed recently a new topnotch postwar committee on scientific matters under the guidance of C. E. Wilson and it may be argued that such a committee would be competent to administer the proposed plan. Yet assurance must be given that the quality of this committee and the interest of its members be maintained in periods when there is much to distract attention.

Under these circumstances, it is my feeling that substantially as much progress will be made on the so-called free enterprise basis as would be made under a plea for the socialization of development work such as proposed by Dr. Keyes.

Chemical Executive

"May I register some cheers?"

May I register some cheers for Dr. Keyes' proposal of insurance plants for the chemical industry? It brings back to me a thing which worried me a lot in 1927-28 when I spent a year in Washington as Chairman of the Division of Chemistry and Chemical Technology of the National Research Council. I was shocked then and I am still shocked at the extent to which large amounts of government research are conducted along lines which would be characteristic of a small business concern with little vision. Too much government research is practically in competition with private research. Exactly the opposite should be true. The government should undertake types of research and development which could not possibly be afforded by individual corporations, even the largest. As Dr. Keyes says, the selection and operation of such government activities should

DR. KEYES REPLIES

My critics seem to be afraid of an evil influence which they term "politics."

Someone once said, "We cannot have motion without friction," and let it be said, we cannot have great developments without politics, even though these developments may be confined entirely within industry. Haven't my friends ever experienced "company or inter-company politics?" Politics are like taxes—they can be reduced but not eradicated.

Through an oversight, Chemical Industries was not furnished with an exact copy of my paper as given before the American Institute of Chemical Engineers in Cleveland last May. A complete paragraph was left out which I give below:

"There are those who sincerely believe that cooperation on major technical problems would tend to stifle individual initiative and delay the solution of the problems. The history of the OPRD chemical projects indicates that this is not so. In fact, individual initiative has been enhanced and problems have been solved much more quickly whenever we have had extensive cooperation between research organizations. For further proof of this statement, the results obtained by the Federation of Paint and Varnish Production Clubs should be noted. No one will question the success and value of the results obtained by this particular cooperative research organization. Another example of cooperative research effort is the Aircraft War Production Council and its Committee on Engineering. It has been said that our present aircraft production would never have come to pass if there had not been set up a cooperative research and development agency such as this."

It will be noted that I did not have in mind the creation of a new bureaucratic federal organization to socialize research and development work throughout the country, but I did indicate that the excellent cooperation we have had during the war might be extended into the peace for the betterment of all of us.

Again let me repeat, this can be brought about only by technical men and not by industrial executives and governmental officials. My critics prove this point.

"The meek may inherit the earth" but our civilization was built on tougher stuff.

Donald B. Keyes, Washington, D. C.

be in the hands of chemists and engineers. Projects should be selected with a real eye to the future.

F. C. Whitmore, Dean
School of Chemistry and Physics
Pennsylvania State College

"Possibly a representative board"

Here are my views relative to Dr. Keyes' proposal for insurance plants for the chemical industry:

1. Industry will not measure itself in terms of strategic materials, i.e., its foresight is relative to its immediate interests and not to wartime national policy or needs.

2. Our armed forces in peacetime have obviously never thoroughly prepared for any war in terms of technical production, new types of arms, etc. The excuse is that "we had no appropriation."

3. The conditions in (1) and (2) will not be cured by either group independently and it is doubtful that a continuous worthwhile program could be had jointly.

4. If the matter is left to some one of the endless number of Government bureaus, the bureau will thrive but the work will not be done.

5. Possibly a board representative of industry, armed forces, Department of Commerce and learned societies selected by the President of the United States could be constituted to handle the matter. Limited tenure of office, absolute prohibition of proxies, liberal funds, annual reports, stated meetings, would be essential. There are groups or boards now that fall partly within this scheme but all lack power and purpose in degree and some of them are wrestling with social problems tied to the other matters. All of the groups suggested need the education and tolerance that meetings would provide. Such a board would probably provide for "insurance plants."

I regret that owing to my connection with certain Government departments I am unable to give a signed opinion on this perplexing subject.

Chemist

Chile Drafts 3-Year Plan for an Expanded Chemical Industry

ALTHOUGH long famous for her great natural deposits of nitrates, Chile has never had what could be called a real chemical industry. That is one of the reasons why chemicals occupy such an important place in the long-range industrial diversification and expansion program currently being formulated by the Chilean government to "insure postwar economic stability" of the nation.

It was in connection with the development of this program that Charles C. Concannon, chief of the Chemical Division of the Department of Commerce, recently spent eight months in Chile as special adviser on chemical matters to the Corporacion de Fomento, a Chilean Government-controlled development organization. As the result of an overall survey of the chemical possibilities of the country made under the guidance of Mr. Concannon, the Corporacion de Fomento is now working on a three-year plan designed to provide a framework for a Chilean chemical industry that will include, among other things, some of the more important basic heavy chemicals, coal-tar products, and wood distillation and cellulose products.

Chile's bid for an expanding economy which would create new wealth and contribute to the health, happiness and rising standard of living of her people, is based largely upon utilization of natural resources. Coal, for example, which is found in several parts of the country, was given serious attention by Mr. Concannon from the standpoint of developing a tar-distillation industry and also facilities for carrying the crudes thus obtained through to finished dyes, pharmaceuticals and other logical end products.

A nation-wide hydro-electrification program on an enormous scale is to provide the basis for electrochemical undertakings.

Sulfuric acid production facilities, by virtue of the almost universal importance of the acid in all types of industry, are being given a high priority in the three-year chemical plan. The sulfur will be obtained by reclamation of pyrites now wasted from copper mining operations.

In addition to taking a forceful role in the expansion of its chemical industry, the Chilean government is actively pushing the further development of such resources as fishing, forestry, agriculture, mining and waterpower, as well as the improvement of communications and transportation facilities.

Many of these expansion activities are interrelated, and, as Mr. Concannon pointed out in a report to Chilean President Juan Antonio Rios, the importance of the chemical industry can be seen from the fact that it is basic to all industry.

For example, the fishing industry, which Mr. Concannon believes has a great future in Chile, in addition to diversifying food production for a more healthful national diet, is important as a source of vitamins and in the production of manufactured foods, fish oils, fertilizers, animal feeds and various industrial products. In this connection, it is interesting to note that a group of experts from the Fish and Wild Life Service of the United States Department of the Interior recently arrived in Chile to make a survey of fishing resources.

Also cooperating with the Chilean Government development concern has been a forestry mission from the United States, the work of which was cited by Mr. Concannon as having a direct significance in the development of the chemical industry plan, particularly from the standpoint of wood distillation and cellulose products.

By vigorously implementing this overall industrial expansion program at present and in the near future, Chilean business men and officials hope to be rewarded by a gradual transition to a peacetime economy from wartime conditions under which Chile is materially assisting in the war effort by supplying copper and nitrates to the United Nations. Chileans feel that widespread unemployment might result unless some program of industrial diversification and development is carried out on an economic basis.

Mr. Concannon praised the Chilean development corporation as being nonpolitical and said it apparently was endeavoring to follow its stated policy of stimulating private enterprise.

In his report to President Rios, he voiced enthusiasm for "the vast improvement in economic ideology or business philosophy brought about by the substitution of the doctrine and practice of plenty and low prices in place of the doctrine of scarcity and exorbitant prices."

Expressing his faith in the successful outcome of Chile's chemical plan, Mr. Concannon added a note of advice to United States industrialists to the effect that Chileans do not like domination of domestic enterprises by foreign capital.

"There is, however, on the part of Chilean officials a distinct desire for commercial and industrial participation on the part of United States firms," he said, "and it seems to me that there are and will be many promising opportunities."

Industrialization of other American countries has received enthusiastic support from leading United States business men, who recently, at the First Conference of Commissions of Inter-American Development, re-emphasized the fact that our best customers are not predominantly raw material countries, but those which, like ourselves, have developed industries.

Meeting the SAFETY PROBLEM in a Small Chemical Plant

by JOHN T. MORRIS, Plant Superintendent
Pennsylvania Alcohol & Chemical Corp., Carlstadt, N. J.

INDUSTRIAL SAFETY has played an important part in making possible the production records that have been established during this war. The emphasis on safe working conditions has paid big dividends, both from the standpoint of conservation of manpower and as a stimulus to better work and happier employees.

Many small plants, however, still feel that a safety program is something only for large plants that can afford a full time safety director. Nothing could be farther from the truth. Not only is there just as much need for safety precautions in small plants as in large, but it is much easier to do an effective job.

Education Most Important

Education is of course one of the basic principles of a safety program, regardless of the size of the plant. Years ago, accident prevention meant retaining those employees with safety consciousness and getting rid of the others. Obviously that practice is now out of date. The enlightened approach is to educate rather than eliminate, and so far as possible place the worker in a job that fits his type and intelligence. Particularly under today's conditions of manpower shortages, continuous operation of a plant must be predicated on worker retention rather than recruitment.

In a small plant it is possible for safety education of employees to be conducted on a more individual and personal basis than in large plants where the job must be done by classroom methods. Safety instruction in the small plant is usually the personal responsibility of the plant superintendent. He can still make use of posters, pamphlets, and other helps put out by the National Safety Council, War Manpower Commission and other agencies, but he must also see to it—either directly or through department heads—that each worker is impressed with the importance of working safely and is given instruction in proper procedure for avoidance of any potential hazard connected with the job. When accidents do occur, their cause should be carefully investigated and steps taken to prevent a recurrence. According to a recent published report, of 77,000 industrial accidents investigated, 88 per cent were a result of man failure rather than machine failure. The element of education cannot be overemphasized.

Safety in Equipment

There is much progress being made in safety engineering today that escapes plant men because it is not ordinarily labeled as such. Equipment manufacturers, for example, are becoming more conscious of the desirability of engineering their products to provide the greatest possible safety and comfort for the operator. Only recently a compressed-air-ventilated mask has been developed for use by welders. Hot fumes—more obnoxious than toxic—were found to be a cause of much annoyance when welding in close quarters. The new mask was developed to alleviate this discomfort, making for both safer and healthier working conditions.

Thus selection of equipment with an eye to safety and comfort as well as operating efficiency and initial cost should be one of the first steps in creating and maintaining safe working conditions in a small plant. Perhaps the first cost of equipment that is well designed from the safety standpoint will be a little higher, but in the long run it will pay cumulative dividends through assurance of worker comfort, reduction of absenteeism, and improvement in general health.

Preventive maintenance is a further requirement for safe working conditions that is frequently slighted in favor of "more pressing" matters in the small plant. Especially in view of the wartime need to "use it up," "make it do," or "go without," a much closer than ordinary watch must be kept on equipment for weak spots and potential hazards resulting from the wear and tear of continuous operation. The best procedure is to provide for a routine checkup of building and equipment at regular periodic intervals. Each check-up should be followed by immediate steps to eliminate any hazardous conditions that are discovered.

The following is a case in point: A workman spreading coal in a yard bin was accustomed to pulling a swiveled chute by means of a half-inch rope. While standing atop the pile at the edge of the enclosure he pulled the rope, which broke and caused him to fall backward to the ground, a distance of 12 feet. The result was a severe back injury.

Another case which comes to mind illustrates the danger of using makeshifts. A member of a crew loading a railway car attempted to stop the car from rolling by throwing a piece of timber under the wheels to act as a chock. However, the moving car swung the timber around so that it knocked the workman under the wheels, severing both legs.

Still another case demonstrates the importance of using the right protective equipment under the right conditions. We once purchased some non-shatterable, clear-vision face shields which were featured as resistant to heat, sparks and acids. Some weeks later several of them were handed in with the lenses practically opaque from contact with acetic acid. When the manufacturer was called, he advised that the shields were made of cellulose acetate. Although no accident was caused in this case, the impairment of visibility was a definite hazard.

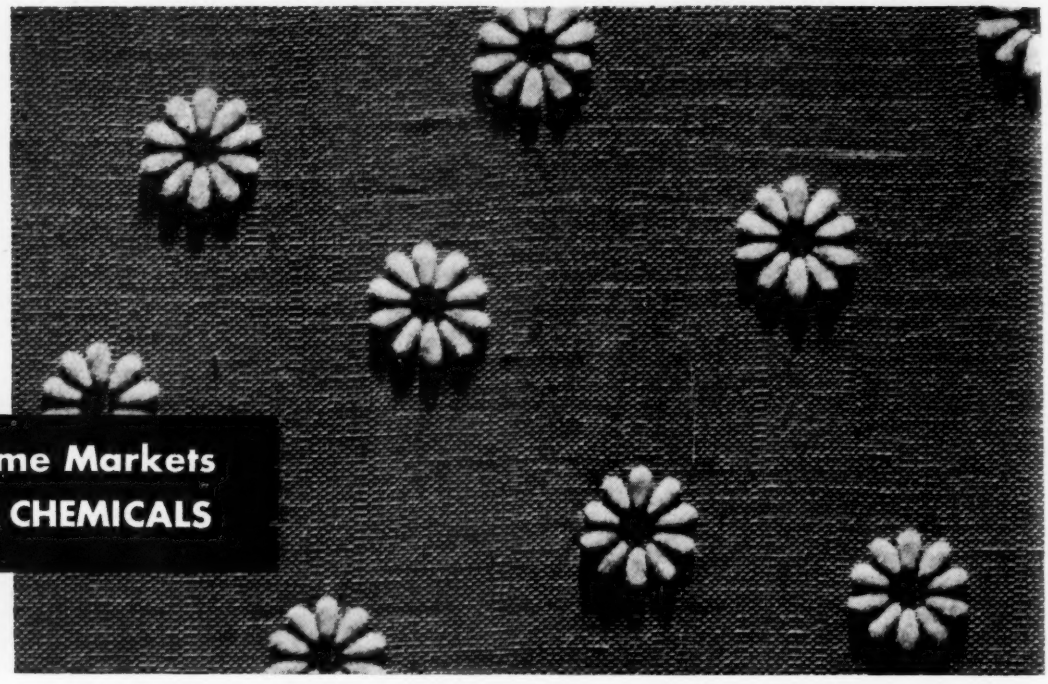
These illustrations are mentioned chiefly to show the variety of safety problems that come up even in a small plant and the importance of preparing employees to meet them.

Must Have Management Support

Finally, there is the attitude of management toward safety. Management must be willing to invest money in proper safeguards, equipment, and other requirements of proven need or the whole program collapses.

We have been particularly fortunate in this respect at Pennsylvania Alcohol & Chemical Corporation. One of the company's most recent large capital expenditures was for a safety project—the redesign of a nitrocellulose storehouse. This required installation of special fire exits, panic doors, cross ventilation, and the erection of a weighing room with outdoor exits. The roof, painted aluminum to reduce interior temperature, is asbestos-covered steel hooked to channel iron purlins for pressure release. Special attention was given to the floor, which is dustless, sparkproof and of a high electrical conductivity. Surfaced with Masterplate, a non-sparking "metallic concrete" containing pure iron aggregate, it conducts static electricity twenty times better than plain concrete. The topping is grounded completely through steel reinforcing bars that reach deep into the subsoil, thus carrying off static charges formed on containers or workmen.

There is a vital need for active safety work in small plants where it is not feasible to employ full time direction. The main thing is to have a definite program, and then stick to it for twelve months of a year regardless of immediate results. Over a period of time the accident records will accumulate facts on hazards to be avoided and will prove most valuable in taking corrective steps.



A new development in textiles: electrocoated fabric. Can be laundered or dry cleaned without damage

II. THE TEXTILE INDUSTRY: Shift Indicates Increased Postwar Stature as a Market

THE TREND TOWARD DEVELOPMENT of tailor-made fibers means that chemists and chemicals must play a key role in the textile industry of the future. So-called functional finishes for fabrics offer endless chemical possibilities. Prewar textile industry proper consumed some $200,000,000 worth of dyes and processing chemicals annually, several million dollars worth of starch, oils and similar compounds. Postwar consumption will far exceed these figures.

THE POSTWAR textile industry will tend increasingly toward a chemical type of industry. This will be manifested particularly by the growth and diversification of synthetic fibers, and by the increased multiplicity of finishes for fabrics made of both natural and synthetic fibers. But these will be effects. The cause is already at work: a drive toward the development of fabrics tailor-made to meet specific needs. In accomplishing such ends, the chemist must play the key role.

The significance of this fundamental trend, to the textile manufacturer, to those who sell to the textile industry, and to the general public, cannot be overemphasized.

For more than a century after the industrial revolution, which started with textiles in England, inventive genius was directed mainly toward the mechanical phases of textile manufacture. Having transferred quite literally the hand-craft processes to the power-driven level, it was necessary to work toward mechanical improvement to permit this stimulation of hand methods at higher speed.

This meant that, during the period of a century or more referred to, there was a rigidity of method and a lack of variety in product.

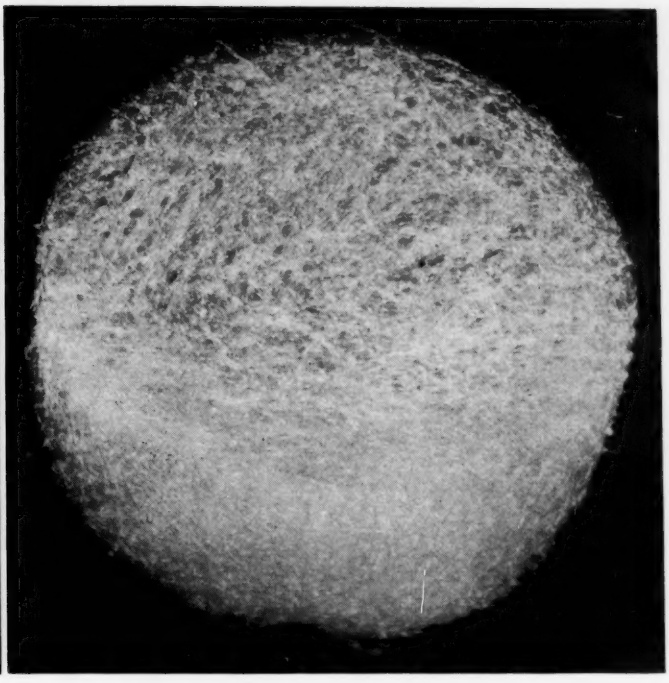
The major change from mechanical emphasis to chemical emphasis started after World War I. It was in the decade immediately following that war that the real impetus in synthetic fibers began, after having lain dormant since Count de Chardonnet's first discovery in the last century. In the period between World War I and World War II, in addition, there was an unprecedented development of new finishes.

Similarly, after World War II, the tempo of this trend will be stepped up. This will be partly the result of developments that were in the making before the war, partly the result of research on military fabrics during the war, and partly the result of competitive pressure from other industries, which will force textile manufacturers to improve their products continually if they are to survive.

Picking Up Where We Left Off

From the standpoint of civilians, the war arrested the effects of certain radical developments. The best-known example, of course, is Nylon. With the able assistance of Japanese aggression, Nylon was well on its way to eliminating silk as a raw material for full-fashioned hosiery. It succeeded in eliminating silk but became itself a casualty, from the consumer standpoint. Since Nylon went to war, Nylon hosiery has become almost non-

An inorganic textile: Fiberglas yarn.



"Bubblfil" cushion, made of bubbles of cellophane.

from Mechanical to Chemical Emphasis for Chemicals • By DOUGLAS G. WOOLF*

existent, except on the black markets. That it will play an important part in the post-war development of the hosiery industry, no one has any doubt whatever. There are some who believe that silk may regain at least part of its position in that field; this writer's opinion is to the contrary.

But aside from the public interest in Nylon as a hosiery material, the emergence of completely synthetic fibers such as Nylon and Vinyon was of fundamental importance to the textile industry. Long torn by the battle between natural and synthetic fibers, that industry now witnessed a new battle: synthetics vs. synthetics. Those synthetics having as their starting point a natural material—such as viscose, cuprammonium, acetate, casein fiber, etc.—faced a new competition, from those completely synthetic fibers. This phase will be resumed as soon as the latter are available again for civilian use. It is unlikely that any decisive stage in the battle will be reached for some time after the end of the war. At the start there will probably be a demand for all that can be produced of both types. Later on, it will be a question of let the best man win. But in any event, an objective view of the textile competitive picture, post-war, indicates that natural fibers will be on the defensive and synthetic fibers on the offensive.

Effect of Military Research

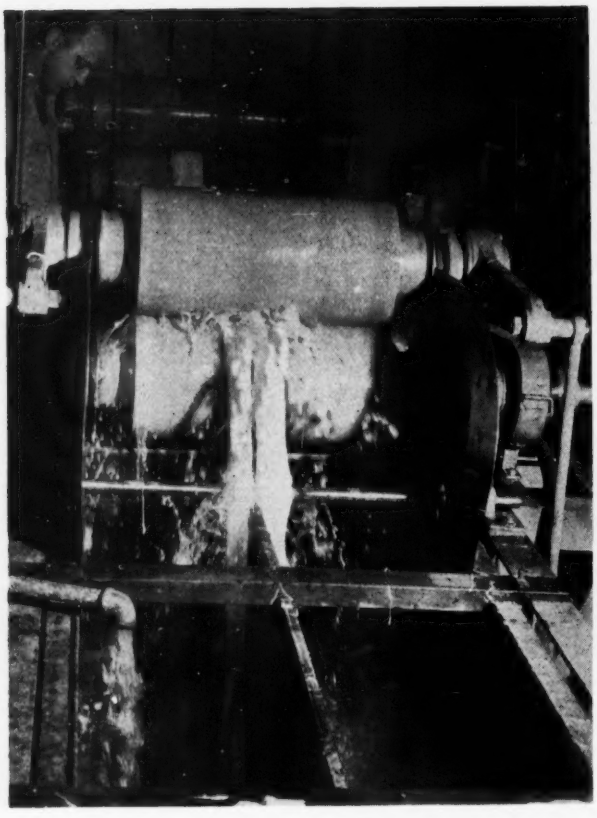
The latter competition will affect the civilian not only from the standpoint of his apparel and household goods. It will have a bearing on durable consumer goods. The best example here is the question of automobile tires. Not so many years ago the idea of rayon in tires was considered more or less a pipe dream. The development of high-tenacity rayon, and the preference given to its use by the Army, represent one of the influences of the war upon the textile picture. This whole question is a good hot potato, and this writer has no desire to choose sides, but it is clearly evident that here again a natural fiber, cotton, will have to defend its position—through research—as a material in tires where it had held complete supremacy. The part which war research played in this outcome cannot be over-emphasized. War-time experiments with high-tenacity rayon as material for airplane and truck tires undoubtedly advanced the position of that material far more than would have been possible in a similar period under peace-time conditions.

An equally striking effect of war research, in the opinion of those close to the industry, has been the impetus it has given to the development of new finishes—particularly so-called functional finishes, which may be defined as those treatments which render a yarn or fabric more suitable for a specific use or uses. The Army was faced with a tremendous problem: to get fabrics which would render the highest type of specific services in extreme conditions of temperature, moisture, etc. It had to develop fabrics for use in the Arctic, in the jungle, in the stratosphere, etc. Much of the results it obtained through its research was by way of the development of new finishes. Research on the thermal insulation of fabrics, on the water vapor permeability of fabrics, and on the water-repellency of fabrics—all for military uses—has opened up a whole new chain of possibilities for the predetermination of functional properties of fabrics for civilians after the war.

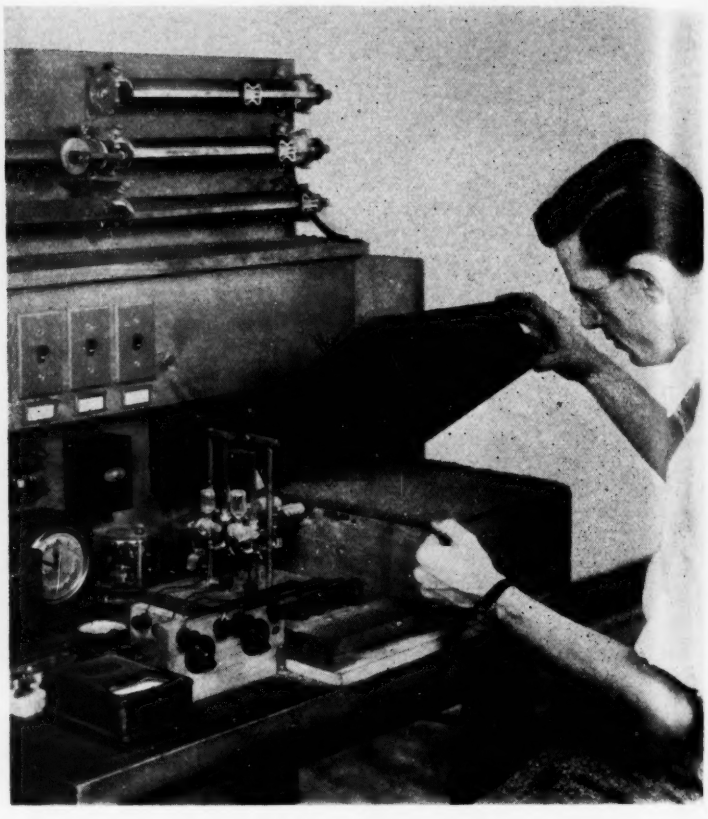
Consequently, although this trend toward emphasis on the finish was becoming more and more important prior to the war, its tempo was stepped up tremendously in the war years.

We may expect to see very important developments among all the so-called functional finishes, such as shrinkproof finishes, waterproof or water-repellent finishes, gas-proof finishes, crease-resistant finishes, flame-proof finishes, mildew-proof finishes, mothproof finishes, and abrasion-resistant finishes. There are also such types of finishes as those applied to

* First Vice-President, Textile Research Institute, Inc.



A washing step in the manufacture of Aralac, a milk casein fiber.



"Warmth" meter is typical of modern textile research tools.

The "warmth without weight" of new ski troop fabrics will find peacetime uses.

Fabrics of the future: wrap-around coverall made of closely woven cotton poplin treated with Zelan water repellent, and air-raid wardens' uniform of flameproofed cotton.

add weight and increase the strength of the fabric, or to make it resistant to acids, alkalies and sunlight, or to impart germicidal properties.

It is unlikely that any one fabric would be made resistant against all possible agencies, since the need for this would probably never exist. However there will be combinations of different finishes which offer most enticing possibilities from the standpoint of those interested in chemical development and chemical research.

It is obvious that in both the increase in synthetic fiber use, and the continued extension of textile finishes, the chemical industry has a very great stake. Taking 1939 as the last year for which information was available, the textile industry proper consumed approximately $200,000,000 worth of dyes and chemicals annually. In addition, it used several million dollars worth of starch, oils, and other compounds, in its manufacturing operations. Furthermore, chemicals are used in large quantities for treating textiles by miscellaneous groups of companies which are not considered as part of the textile industry proper.

All these uses will increase inevitably. Each year, the chemical industry will have an increasing interest in textile progress.

Pressure From Other Industries

Of the three factors previously listed in this article which will be responsible for the new textile tempo in the post-war period, the third factor—the competition

This fabric can "take it."

Samples of cloth being given Army weather test.

from other industries—is potentially the most important and also the most difficult to analyze.

The competition within the textile industry itself—first of all between sections of the country such as the North vs. South struggle back in the 1920's, and then among different fibers and different types of equipment—has been accompanied and to some extent overshadowed by this pressure from other industries, both for markets previously considered safe for textiles, and for part of the textile industry's share of the consumers' dollar.

Textiles vs. Paper

The outstanding example of the bid for erstwhile textile markets is to be found in the paper industry. Through research, dating back to the fateful year of our economy, 1929, and through aggressive merchandising and promotion, the paper industry has made tremendous inroads upon the textile field—primarily in household articles but more recently even in apparel.

But there is a threat from a new form of competition which might eventually make this pressure from the paper industry seem mild by comparison. This lies in the possibility of completely synthetic fabrics, made without benefit of existing standard textile equipment. To many, this idea seems fantastic, but so have many of the great developments of the past seemed almost impossible, until they became actualities.

Obviously, the further replacement merely of natural fibers by synthetic fibers would not of itself mean the elimination of the textile industry as we know it today. It would cause further inroads upon the spinning part of the industry but presumably the weavers—or at least those with physical and mental flexibility—could adjust themselves to further change in the raw material which they have to process. However, the development of completely synthetic fabrics made by extrusion or by some other method familiar to chemists, would definitely threaten the existing textile industry.

It is the realization of these facts that has created the new interest in textile research—particularly the interest in a type of research which sets out to defend no one fiber or type of equipment, but rather to keep abreast of the facts and present those facts to the textile industry so that the individual manufacturers in turn can shape their policies in such a way as to meet these challenges and in fact offer a challenge to other industries for a share in their markets.

The Chemical Industry's Stake

Not only has the chemical industry a great stake in the increase in synthetic fiber use and in the extension of textile finishes, as previously noted in this article, but it also has a tremendous interest in the competitive relationship between the textile industry and other industries.

Speaking quite objectively, this writer feels that in a sense the chemical industry is both a supplier to, and a competitor of, the textile industry. A good part of the synthetic fiber development is taking place in the chemical industry. It is possible that the development of completely synthetic fabrics would also have its origin there. So presumably there might be a conflict in the chemical industry's attitude towards the textile industry—a conflict between its desire to retain customers and its desire to find new fields for its own primary operation.

The broad-gauged members of the textile industry are aware of this fact and although they follow it closely they are not frightened by it. They recognize only too well that it is becoming more and more the responsibility of industry to supply products best fitted to meet particular needs, at the best possible price, and yet on the basis of manufacturing operations which permit a high level of wages and good working conditions. They also recognize that if one industry does not meet these requirements, another will. They know what the absence of a good research background cost the textile industry in the difficult days of the 1920's when other industries of this country were booming. They are determined to find through research the answer in the new postwar period. Consequently the chemical industry may find that through research the textile industry has built itself into an even greater purchaser of chemicals, rather than—through lack of research—putting itself in the position of a target for competition from the chemical industry.

Organo-Silicon Compounds Emerge from Laboratory

ALTHOUGH ORGANO-SILICON COMPOUNDS have been studied in laboratories for many years their commercial importance was not recognized until a short time ago. However, with the formation of the Dow Corning Corporation for their commercial production, it would not be surprising to see the silicones develop into an important branch of industrial chemistry.

NEW CHEMICALS FOR INDUSTRY have been pouring out of laboratories in a steady flow during the past decade but few of them have aroused the interest and excited the imagination as did the recent announcement of the commercial availability of a group of organo-silicon products by the Dow Corning Corporation. The reason for this special interest is that although organo-silicon compounds have attracted the attention of research men for more than a generation, resulting in the preparation of an enormous number of silicon compounds, the practical application of such compounds has been quite insignificant.

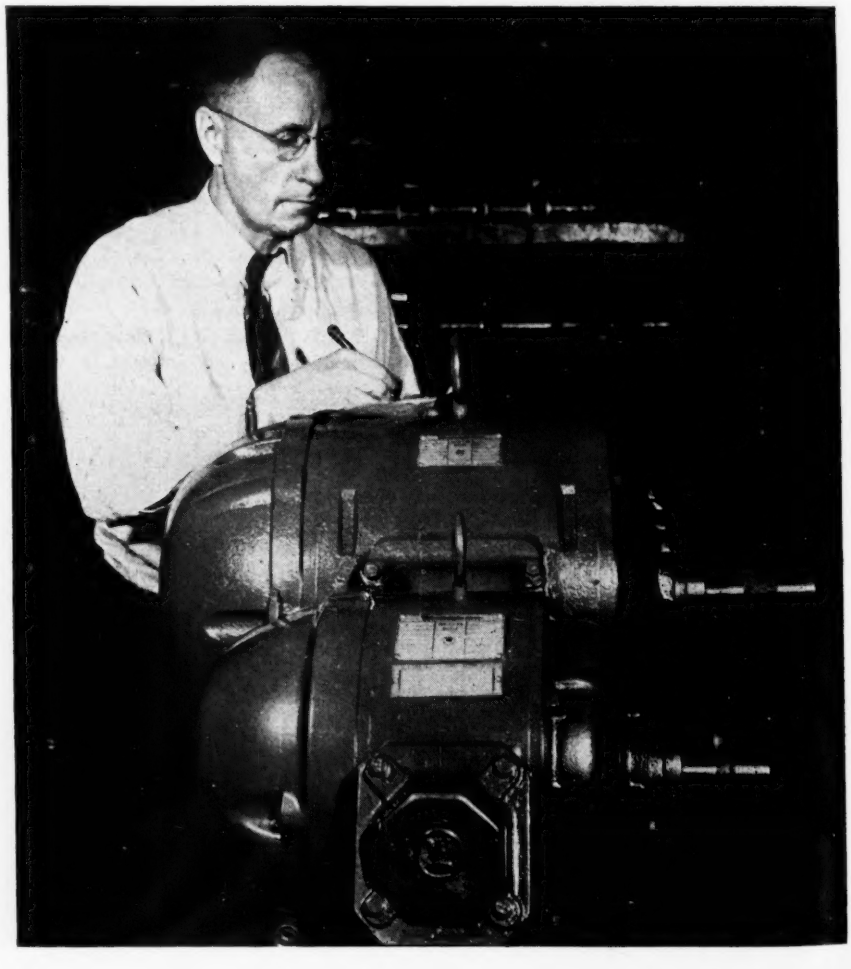
Now, however, with the commercial production of silicones, a practically new and untried class of organo-silicon oxide polymeric materials is made available to industry. As now produced, silicones are oils, greases, and resins of unique stability against heat and chemical action. Their heat stability, inertness and electrical properties are in large part due to the fact that they are built upon frameworks of silicon and oxygen atoms. These properties make them especially important for use in electrical insulation. They are also useful as hydraulic fluids, as pump packing impregnants for use in handling hot liquids, as waterproofing materials, for paper, textiles and other materials, in the treatment of ceramics to reduce surface conductivity, as chemically-resistant lubricants and many others.

Silicones are manufactured from sand, brine, coal and oil. The sand provides the silicon. The brine provides chlorine to produce silicon tetrachloride, and the coal and oil provide the organic constituents. In the synthesis of the silicones an organic chloride is reacted with magnesium in ethyl ether to produce the standard Grignard reagent. The alkyl magnesium chloride solution is then added to an ether solution of silicon tetrachloride and depending on the proportions and conditions one or more of the following compounds are formed $R\,SiCl_3$, $R_2\,SiCl_2$, $R_3\,SiCl$, R_4Cl.

Upon the addition of water the chlorine is replaced respectively as follows: $R\,Si(OH)_3$, $R_2\,Si(OH)_2$, $R_3\,Si(OH)$.

A mixture of the first two compounds may comprise the baking lacquers, varnishes and resins while the second and third compounds comprise the liquids and greases.

The advantage of heat resistant silicones in insulation materials is emphatically shown here. The small electric motor in the foreground produces the same horsepower as the larger one in the background, without increased operating speed. These motors were manufactured by the Westinghouse Electric and Manufacturing Co. which has cooperated closely with Dow Corning on the development of silicones as insulation materials.



Upon polymerization these silicones may join in straight chains or in cyclic form, either with or without cross linkages depending on the starting materials and conditions. There are, therefore, a great number of end product possibilities. The linkage, —Si—O—Si—O is said to be responsible for the unique properties of the materials and especially for their heat resistance.

Dow Corning Origin

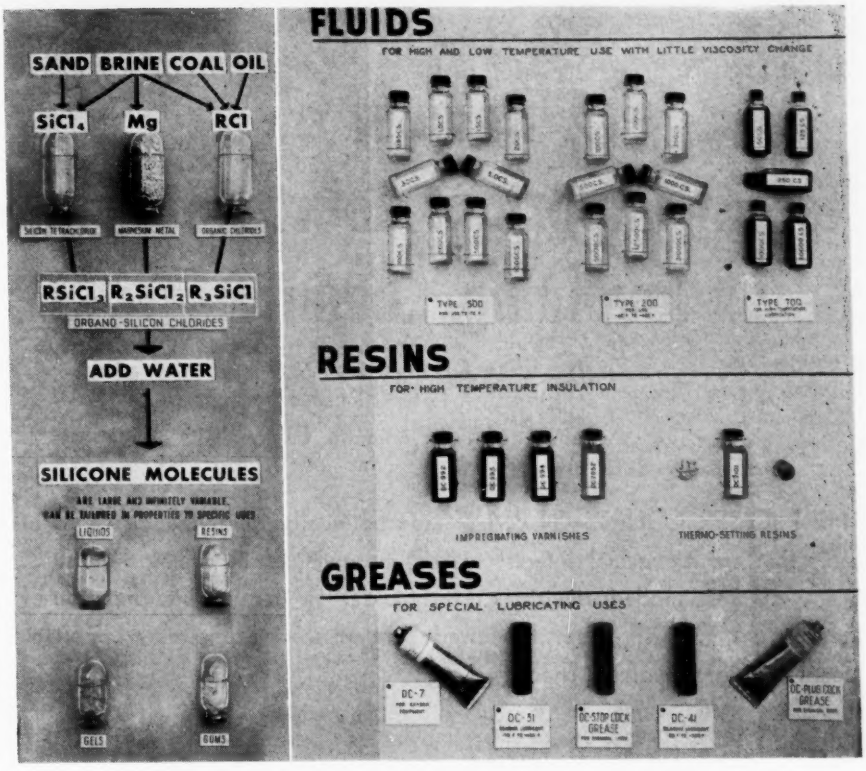
According to officials of the Dow Corning Corporation, their new silicone products had their origin a number of years ago when Dr. E. C. Sullivan, Director of Research for Corning Glass Works, decided to investigate the field of polymer chemistry lying between that of glass on the one hand and organic plastics on the other. Interest in this field was stimulated to some extent by the advent of glass-like plastics.

At the same time Corning men were working on the manufacture and use of glass fibers for electrical insulation. The important advantage of the glass fiber for this application is its ability to stand high temperatures. However the Corning investigators found that there was no varnish or resin that was sufficiently heat resistant to use along with the glass fibers. It finally became apparent that the silicones, because of their ability to withstand high temperatures, could be ideal for use with insulation.

In the meantime the silicones showed such promise for a diversified field of application that it was decided to use the services of a glass fellowship at Mellon Institute to study the organo-silicon compounds in general. As a consequence, a series of waterwhite liquids was developed in a range of viscosities varying from liquids as thin as water to solid resins.

When it became obvious that substantial amounts of silicones would be necessary in order to prove their value, Corning enlisted the aid of the Dow Chemical Company to produce semi-commercial quantities. After considerable cooperative work had been done by Dow, Corning and Mellon the influence of the war made it apparent that steps should be taken to produce large amounts of some of the silicone products. It was decided, therefore, by Dr. W. H. Dow, president of the Dow Chemical Co. and Glen W. Cole, president of Corning Glass Works that a company should be formed for the manufacture and development of these materials. Accordingly, in February, 1943, Dow Corning Corporation was formed.

In September, 1943, construction was begun on a Dow Corning manufacturing plant located at Midland, Mich., to produce a wide variety of silicone products. The laboratory and offices are now in use and a pilot plant is in operation. Production units are expected to start operation in a few months.



Starting from sand, salt, coal and oil organo-silicon compound can be made in great variety for hse in a broad line of industrial products.

Although Dow Corning is the first to announce the commercial production of these materials there has been a certain amount of work on silico-organic compounds for a number of years. Actually it might be said that an Englishman by the name of Frederic Stanley Kipping is the father of silicone chemistry. Starting out when he was a young chemist in the early 1900s he spent much of his time on the synthesis and study of a great many organo-silicon compounds. During the years he published a number of papers on his work. He apparently never realized the commercial possibilities of silicones and in one of his last papers went so far as to say that this field of chemistry was about worked out and of no commercial importance.

Other Investigators

In this country the General Electric Company was an early investigator of the silicones and has made considerable use of them in electrical equipment. Beginning about October, 1941, there have been several U. S. patents awarded to Rochow and Patnode, two G. E. chemists, for organo-silicon compounds and their applications. Early in 1943, G. E. announced a new waterproofing material, called "Dri-Film" for use on cloth, paper, ceramics and other materials. The announcement did not say what the material is but it can be said now that it is methyl silicon chloride. Since that time G. E. has undoubtedly accomplished further results with silicones.

The Russians have also done work on the silicones. In 1937, I. A. Andrianov published a review of this work in *Industrial Organic Chemistry* (U.S.S.R.). In summing up he said:—

"The extent of the work done by us does not correspond to the importance of this broad and complex problem. In order to obtain practical results and to introduce them into industry it is necessary to do more work on the investigation of silico-organic compounds. Even now a number of trends could be noted which might soon lead to valuable practical results and permit the utilization of silicon for preparing synthetic resins, film-forming materials, electroinsulation materials and plastics."

In addition to Dow, Corning, Mellon, and G. E., work has been done on organo-silicon compounds by the Montclair Research Laboratories and by some of the Universities, among which is the work of Post, University of Buffalo, described in his book, *The Chemistry of Aliphatic Ortho Esters.*

As a new class of commercial products there seems to be a good future ahead for the silicones in view of the low cost raw materials required and the valuable properties of the products. The drawback at the present is said to be the costly and difficult Grignard method of synthesis. However, work is being done on other processes of manufacture and chances of success are said to be good. Putting the low cost raw materials together with the prospect of lower cost processes, it may well be that the silicones will find broad use in industry.

A Review of Recent Important Court Decisions Involving Chemicals

by LEO T. PARKER
Attorney at Law, Cincinnati, Ohio

THE HIGHER COURTS OF LAW are continually rendering decisions in cases that are of special interest to persons engaged in chemical pursuits. Many of these modern decisions reverse older law because interpretation of the law changes with time. Reviewed here are some of the more important recent decisions involving chemicals.

Chemical Damages Automobiles

MODERN courts consistently hold that a distributor and retailer are jointly or separately liable in damages resulting from injurious chemicals supplied or sold by them.

For example, in Ahrens v. Moore, 178 S. W. (2d) 256, reported May, 1944, it was shown that a distributor purchased anti-freeze which was represented to him as a new formula and made without critical war materials. The anti-freeze was received in carload lots and stored in his warehouse and distributed in the original sealed containers to the purchasers.

In a short time after being put in the radiators, the anti-freeze disabled the cars. Witnesses testified as to various damages. The anti-freeze solidified rather than remained liquid; it corroded radiators, destroyed rubber hose connections, ate out the gaskets, got in the working parts of the cars, ruined the ignition, and otherwise damaged the cars.

Numerous users filed suit against the distributor to recover damages. In holding the latter fully liable, the higher court said:

"Where a dealer purchases and sells a new and experimental product not in general use, and with knowledge or notice of its dangerous qualities, and makes positive representations that it is fit for its represented use, such dealer cannot claim immunity from liability for damages that follow such use."

County Not Liable

ALTHOUGH A STATE, county or municipality may purchase chemical materials and supplies, it is not liable for payment therefor unless the contract of purchase is approved by legally authorized officials.

For example, in Consolidated Chemical Laboratories, Inc. v. Cass County, 53 N. E. (2d) 738, reported April, 1944, it was shown that the Sheriff of a county purchased certain chemicals for the Court House and Jail from a salesman for the Consolidated Chemical Laboratories, Inc. The salesman failed to have the contract of sale approved by the county officials who later refused to pay the account. The chemical company sued the county. The lower court held the county liable but the higher court reversed the verdict, and said:

"While it is true that the Sheriff is entrusted with the care and custody of the Court House and Jail we believe his authority to create a liability against the county for supplies is subject to control by the Board of Supervisors of a County."

Law of Patents

BROADLY SPEAKING, the following things are *not* patentable:

A mere idea without mechanical means to demonstrate the practicability of the idea.

A principle known to science.

A mere result.

A property of matter.

An aggregation of old parts which do not co-act to produce a unitary result.

A system for doing something.

Things having an immoral object.

Things created by "mechanical skill," and which do not require inventive ability.

All devices that are inoperative.

All devices that are not new and useful.

In Re Sussman, 141 Fed. (2d) 267, reported March, 1944, the Patent Office refused to allow a patent on an application containing claims as follows:

"A process for the preparation of (methoxy methoxy) ethanol which comprises reacting methylal with ethylene glycol in the presence of a sulfuric acid catalyst and after equilibrium has been substantially established, neutralizing the sulfuric acid catalyst and separating the (methoxy methoxy) ethanol from the reaction product by distillation."

"A process for the preparation of (methoxy methoxy) ethanol which comprises reacting methylal with ethylene glycol."

"A process for the preparation of (methoxy methoxy) ethanol which comprises reacting methylal with ethylene glycol in the presence of an acidic type catalyst."

Must File Application

MODERN HIGHER COURTS hold that when an inventor perfects and reduces to practice an invention, and fails for an unreasonable period to take steps to give it to the public, and until someone else has independently invented and patented it, the earlier inventor forfeits his rights to a patent against the later inventor.

For example, in Muskat v. Schmelkes, 140 Fed. (2d) 984, reported March, 1944, it was shown that an inventor was issued a patent for a chlorinated melamine, which is a nitrogen compound ordinarily obtained in the form of a powder, the melamine forming the carrying agent for the chlorine, which is capable of being liberated for the purpose of oxidizing, bleaching, sterilizing, or for bactericidal reactions. The most important utility of the compound is for the purpose of destroying bacteria in liquids, such as milk and drinking water.

Eight months later another inventor filed an application for the same patent and asked the court to revoke the issued patent and grant the patent to him because he had experimented with and perfected the invention long before the one who had obtained a patent. However, the higher court refused to reissue the patent to the inventor who was tardy in filing an application for a patent. This court said:

"It is our view that appellee (last inventor) has not proved beyond a reasonable doubt that he had reduced his invention to practice prior to the said filing date of the appellants, and that the decision of the Board of Interference Examiners awarding priority to appellee was erroneous. Its decision accordingly is reversed."

Court Reverses Patent Office

IT IS WELL KNOWN that no inventor may obtain a patent on an old invention. However, very frequently the courts disagree

with the decisions rendered by the Patent Office officials.

For illustration, in Barnes, 140 Fed. Rep. 1006, reported April, 1944, the Patent Office refused to grant a patent containing a claim, as follows:

"A method of producing ammonium alkali metal ferricyanide which includes reacting in aqueous solution an inorganic ammonium salt and alkali metal ferricyanide."

In this case the Patent Office Examiners rejected the patent on the ground that it disclosed nothing new over a prior British patent. However, the higher court ordered the Patent Office to grant the patent.

Modern higher courts hold that novelty alone is not sufficient to impart patentability to a claim. Invention must be present. Moreover, in order to be patentable, the novel members of a homologous series of chemical compounds must possess some unobvious or unexpected beneficial properties not possessed by a homologous compound disclosed in the prior art.

For example, in Hass, 141 Fed. (2d) 127, the higher court refused to grant a patent containing a claim, as follows:

"l-Phenyl-2-nitro-l-butene."

Also, the court refused to grant a patent containing the claim:

"l-Chloro-l-nitro-butane."

Employer Liable for $20,000 Damages

IT IS WELL ESTABLISHED law that a duty is imposed upon an employer who deals in a chemical which he knows, or ought to know, to be peculiarly dangerous. He must give notice of its character or bear the natural consequences of his failure to do so.

Modern higher courts have adopted the legal rule that a company which supplies directly or through a third person a chemical is subject to liability for injuries to others if he (a) knows, or from facts known to him should realize that the chemical is or is likely to be dangerous for the use for which it is supplied; (b) and has *no* reason to believe that those for whose use the chemical is supplied will realize its dangerous condition; and (c) fails to exercise reasonable care to inform them of its dangerous condition or of the facts which make it likely to be so.

For example, in Orr v. Shell, 177 S. W. (2d) 608, reported January, 1944, the higher court awarded an employe $20,000 damages against his employer for contraction of Bright's disease through use of dangerous chemical ingredients in compounding insect sprays.

The testimony proved that the employe assisted in the manufacture of the insect spray containing a chemical known by the trade name of Kesscocide. It was a synthetic, patented compound known chemically as alpha-naphthylisothiocyanate. A white crystalline solid, it looked like salt or sugar. The chemical was dissolved in a base oil which acts as the carrier in a spray. This court said:

"We hold the $20,000 award not excessive. . . . The basis of liability is not in contract but arises from a social responsibility to use due care to avoid injuring those persons likely to be injured if such care is not used."

Review State Workmen's Compensation Act

GENERALLY SPEAKING, employes are entitled to recover compensation under the State Workmen's Compensation Act for injuries sustained while attending to their regular duties. However, all employes must promptly file their applications for compensation, otherwise compensation will not be awarded.

For illustration, in Young v. Industrial Accident Commission, 146 Pac. (2d) 693, reported April, 1944, it was shown that an employe was injured while he was using a solution of caustic soda and trilite. The higher court refused to award compensation for injury because the employe did not promptly file his claim.

Another important point of law is that no compensation for an injury is allowable unless the employe proves that he was injured while working "within the scope of his employment."

In Carter v. Hercules Powder Company, 28 S. E. (2d) 736, it was shown that a workman was injured when a solution of alcohol, ether, and dinitrotoluene was splashed into his eye. He noticed a week or ten days later that the sight of the eye was becoming impaired, and he went to specialists who diagnosed the condition as cataract of obscure etiology. The higher court refused to allow compensation and explained that the evidence showed that it is just as probable that the disability resulted from a noncompensable as from a compensable cause. The court said:

"There is no testimony whatsover that a single application of this particular chemical solution will cause or result in a cataract."

Lead Poisoning

MODERN COURTS recognize that chronic lead poisoning is an occupational disease and disability caused thereby is not compensable, unless the State Workmen's Compensation Act clearly includes occupational diseases.

See National Zinc Company v. Goines, 145 Pac. (2d) 183, reported February, 1944, where the higher court refused to allow compensation to an employe for lead poisoning because the Oklahoma State laws do not extend to disabilities which result from an occupational disease.

Miscellaneous

IN STATE V. PITTSBURGH TESTING LABORATORY CORPORATION, 13 So. (2d) 710, the legal question presented the court was whether a corporation engaged in carrying on analytical chemistry and research chemistry is engaged in the practice of a profession.

This court held that a corporation cannot be a chemist or practice a profession, and the mere fact that it is engaged in an enterprise which requires the services of chemists would in no sense afford authority for the corporation to avoid payment of the State occupational taxes.

IN GARDNER V. INTERNATIONAL COMPANY, 49 N. E. (2d) 328, suit was filed against a company by certain nearby property owners to recover damages, charging the company with improper operation of its plant. They alleged that the company maintained an open sewage pond into which chemicals were emptied and that "large quantities of chemicals, gases, odors, fumes and other unwholesome, noisome, unclean and irritating matters were emitted into the air" and pervaded the air around the residences.

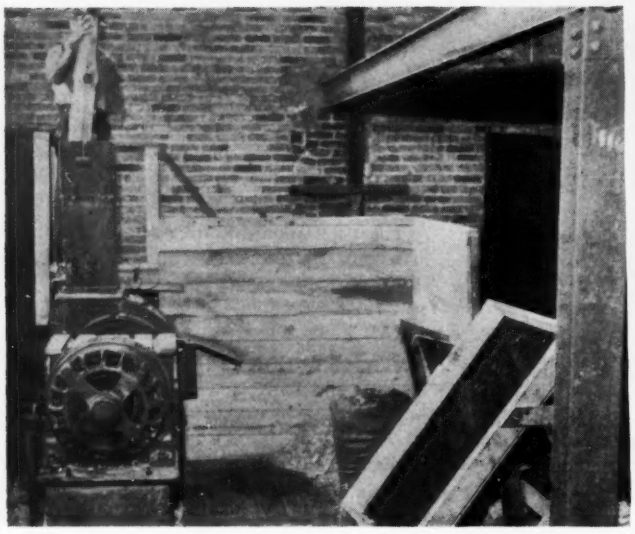
It is interesting to observe that the higher court refused to hold the company liable in damages and explained that the hum of industry and "the whir of busy wheels" is vital at this time to our national defense.

IN ROGERS V. GILCHRIST COMPANY, 45 N E. (2d) 744, it was disclosed that a woman proved that she bought a dress from a purchaser who had purchased it from the manufacturer. When she wore the dress her skin broke out in a rash. She had never before had any skin trouble, and her physician testified that the woman's condition was "a chemical dermatitis." He stated that in his opinion the dress caused it. A biological chemist testified that he tested the dress and found that it had been improperly dyed in that the "dye intermediate," a toxic substance, had not been completely oxidized.

The jury held the woman entitled to recover damages.

IN BISHOP V. EAST OHIO GAS COMPANY, 36 N. E. (2d) 479, a chemist sued a gas company for $50,000 damages and testified that he had spent five and a half hours per day over a period of about ten years, totaling 20,000 hours, in developing a liquid called "Almalac." He claimed that as a result of his experiments and analyses he isolated and incubated various bacilli, in fourteen different germs, and eventually retained five as suitable for his purpose. He testified that an agent of the gas company "unlawfully and forcibly" broke into the basement of his residence for the purpose of turning off the gas, and that the agent in some way broke and destroyed the liquid denominated "Almalac."

The lower court granted a verdict of $10,500 in favor of the chemist. The company appealed to the higher court which reversed the lower court's verdict.



Left: Some of the wood is put through a hog chipper and screened. Right: The chips are loaded into the percolator for hydrolyzing.

ETHYL ALCOHOL from WOOD WASTE

by HOWARD C. E. JOHNSON, Assistant Editor, Chemical Industries

Illustrations courtesy Forest Products Laboratory

FOREST PRODUCTS LABORATORY'S modification of the Scholler process for acid hydrolysis of wood to sugar, and thence by fermentation to ethyl alcohol, will get its big test in the government-sponsored Willamette Valley Wood Chemical Company plant scheduled for completion early next year. The process overcomes certain shortcomings of the Scholler method, and provides access to large additional sources of alcohol, but chances of its attaining much more than insurance status seem remote at present.

ON May 15, 1944, WPB Chief Donald M. Nelson announced approval of the $2,247,000 project of the Willamette Valley Wood Chemical Company for a plant near Eugene, Oregon, to produce industrial alcohol from wood waste. This is the culmination of work initiated last year by the Office of Production Research and Development to adapt to American conditions the Scholler process for hydrolysis of wood to sugar and fermentation of the sugar to ethyl alcohol.

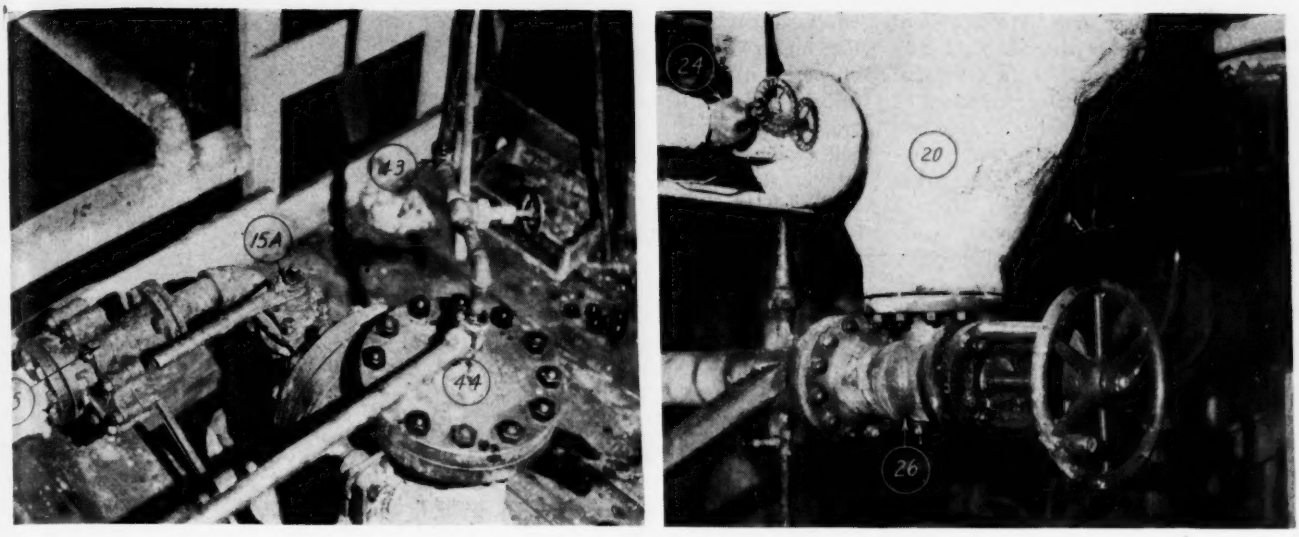
Although the OPRD project is based on the Scholler process, which was developed in Germany and used there successfully for a number of years, sugar from wood is nothing new in the United States. The first commercial process on record was established here in 1903. During World War I about six million gallons of alcohol were produced from this source, and while operations were discontinued for economic reasons in 1922, development progressed in European countries, particularly Germany, and the Scholler process emerged there as the most successful of a number of modifications that were tried.

When the United States embarked upon the present war, it became evident very early that every available source must be explored in order to meet the enormous requirements for alcohol. Accordingly, the Office of Production Research and Development contracted in January, 1943, with the Forest Products Laboratory of the U. S. Department of Agriculture in Madison, Wisconsin, and the Cliffs Dow Chemical Company of Marquette, Wisconsin, to reinvestigate the use of wood waste in the light of the successful German developments by Scholler. At the same time the Vulcan Copper and Supply Company of Cincinnati was requested to follow the pilot plant progress and prepare engineering designs for plant operation. Members of the Washington office of the U. S. Forest Service represented OPRD to advise and coordinate the activities of these groups.

On the basis of the pilot-plant and laboratory data, plans were drawn for the Willamette Valley project, which will have a capacity of 11,500 gallons a day, or about 4 million gallons a year. This is not a significant amount in the present alcohol program, but its chief value will lie in the establishment of efficient design and operation in case additional plants are needed. Pilot-plant data cannot be extrapolated with any degree of certainty to production units, and consequently some difficulties can be anticipated. It is not expected that any alcohol will be produced until the spring of 1945.

Economics a Question

Economically, and aside from wartime demands, the hydrolysis of waste wood is a highly questionable proposition. It cannot compete at the present time with the fermentation of molasses or the hydration of ethylene from "cracking" gases



Left: Top view of percolator with operating lid in place. Right: Bottom of percolator. Numbers in circles refer to flowsheet, p. 228.

as a source of alcohol, although it does provide an almost inexhaustible possibility for the future.

It is estimated that there are 30 million tons of wood wastes annually—sufficient for almost three times our present expanded demand for alcohol and it is further estimated that large-scale production might reduce the price to 20 or 25 cents per gallon, in which case it could compete under prewar conditions with that obtained from molasses. It offers an advantage over grain in that the latter can normally be used more profitably for other purposes.

The economics of the process are concerned chiefly with operational rather than material costs; i.e., power, process steam, water, and transportation. The only chemicals required are sulfuric acid and lime, and small amounts of urea, phosphates and soda ash for the fermentation.

The plants must be located in lumbering regions, near cheap and abundant power, and where there is cheap transportation. A balance must be struck between large plants for low operating costs and small plants for reasonable transportation costs. The size of the Oregon plant was decided after consideration of these two factors.

Any cellulosic material, of course, is a potential source of alcohol. Dry wood, such as white spruce for example, is 55 per cent cellulose, corresponding to 98 gallons of alcohol per ton. The best yield obtained in pilot runs was 62 gallons per ton—a yield of 63 per cent. The average yield is 50 to 55 gallons, but those in charge of the research are hopeful that this might be improved. Indeed, these yields are equal to or greater than those obtained by the Scholler process, and the operating time has been cut two-thirds.

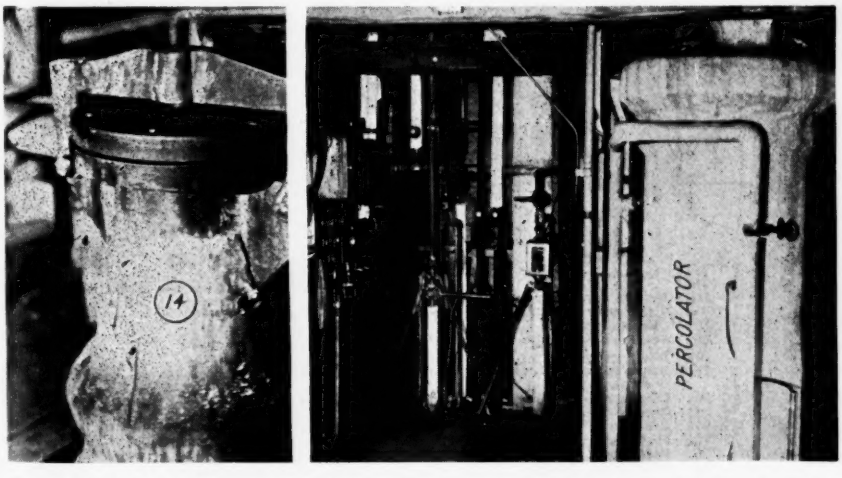
The Process

Briefly, the process consists of treating dry wood chips or sawdust with dilute sulfuric acid at high temperature and pressure to hydrolyze the cellulose to sugar. The wood charge is submitted to several cycles at successively higher temperatures until the concentration of sugar obtained is so low that further processing is not justified. The spent wood, now practically lignin, is dried and used as fuel. The sugar-containing wort is neutralized, filtered and fermented, and the dilute alcoholic liquor is distilled and rectified.

In practice, however, the process is not so simple as the above oversimplified picture would imply. Wood is not of homogeneous structure either physically or chemically; and because of that fact, the three simultaneous processes occurring during hydrolysis—sugar formation, sugar decomposition and diffusion of liquid into and out of the chip—are constantly changing during the progress of the reaction. The breaking down of the cellulose molecules is affected over a wide range of time, temperature and acid concentration; but conditions must be carefully controlled in order to prevent incomplete hydrolysis on the one hand or decomposition of the sugar on the other. The species of wood, its physical state, dryness and purity, the ratio of dilute acid to wood, neutralization and fermentation procedures, and factors governing tar formation and lignin removal are all important considerations. A total of 150 pilot runs were made in order to discover the effects of all these variables. Some of the results are summarized below.

The lower cellulose aggregates, called hemicellulose, are readily dissolved, while the alpha cellulose, a polymer of higher molecular weight, requires more strenuous conditions. If the initial temperature is too low the wort must be rehydrolyzed in order to break down the dissolved hemicellulose. This is a time-consuming operation in the Scholler process which has been eliminated by the American research groups. Important, too, is the number of cycles. Too low a number, with correspondingly greater temperature increments, causes a reduction in yield; too many give so dilute a sugar solution that processing is cumbersome and expensive.

The species of wood makes a great difference in the amount of alcohol obtained. The coniferous woods such as Douglas



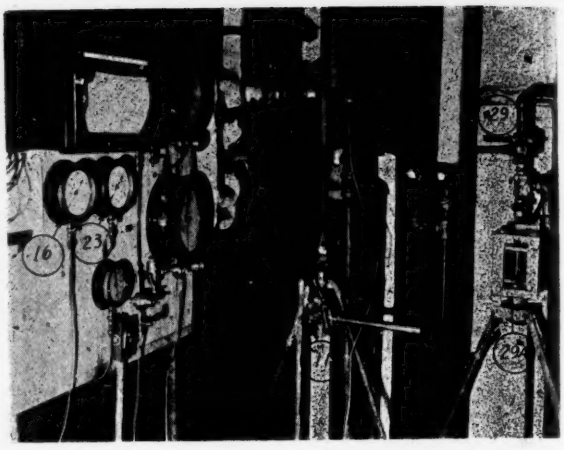
Top and mid-section views of percolator. Top view shows the quick-opening shocking lid in place. The percolator consists of a bronze tube 23 in. inside diameter, 9 ft. long.

fir and white spruce give 50 to 60 gallons per ton, while the hardwoods yield only 30 to 40 gallons. A part of the difference may be due to the greater resistance of the latter to penetration by the aqueous acid. This is not the whole story, however, since a lower percentage of the sugar from hardwoods is fermentable. Most of the studies were made on coniferous woods because of their greater availability, but the process might well be adapted to hardwoods with satisfactory results.

The size of the chips can vary over a wide range. Chips retained on a ⅜" screen gave yields comparable to those obtained from sawdust. In practice, a layer of coarse chips is placed on the bottom of the percolator to facilitate passage of the wort and removal of the lignin residue.

Most of the wood used in the experiments was free from bark; but since commercial wastes will contain bark as well as wood, some study was made of its effect. Its inclusion does not hinder the operation although it contributes little to the yield of sugar. Moisture, mold and stain also affect the yield to some degree. A high moisture content can be compensated for by increasing the acid concentration in the initial cycle; then the only effect is that, because of the higher specific heat of water, it takes longer to bring the charge up to proper temperature. Rot and mold reduced by a quarter the yield of alcohol, but blue stain did not have a noticeable effect.

Having solved the problems of hydrolysis, the investigators were troubled chiefly by tar deposits and plugging of the system by the lignin residues. These difficulties, the bane of the Scholler process, were eliminated in the pilot runs by controlling the size and time of the runs and the procedure of cooling and neutralizing the extract.

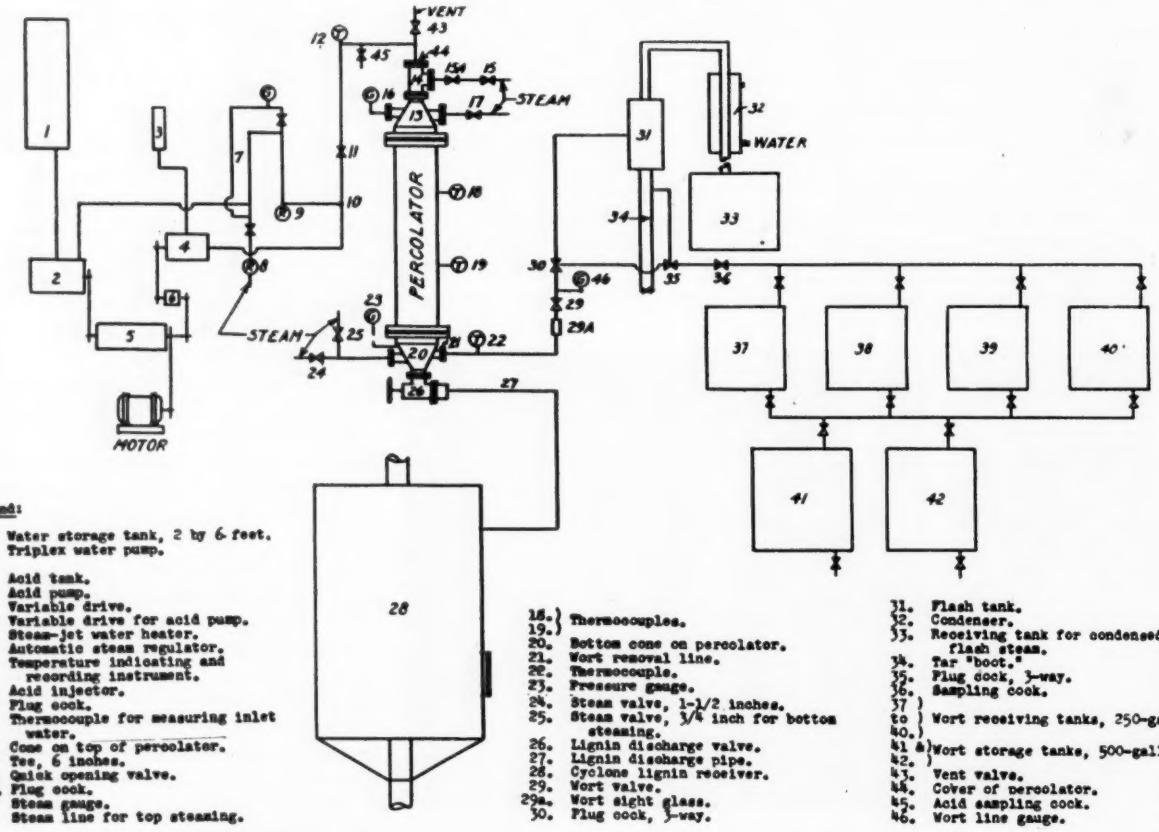


Control instruments. Shown here are steam gauge, steam regulator, pressure gauge, wort valve and wort sight glass

Fermentation Problems

Fermentation presented its own peculiar problems. Inhibiting substances leached or produced from the wood caused a lag in the action of the yeast. It was discovered that variations in the neutralization procedure caused great differences in the susceptibility of the wort to fermentation. By regulating the conditions and choosing the proper yeast strains, it has been found possible to carry out the fermentations in a 29-hour cycle instead of the 60 to 96 hours required previously. It is necessary to add urea and phosphates as nutrients for the yeast, but the amounts

Flowsheet for Acid Hydrolysis of Wood



Legend:

1. Water storage tank, 2 by 6 feet.
2. Triplex water pump.
3. Acid tank.
4. Acid pump.
5. Variable drive.
6. Variable drive for acid pump.
7. Steam-jet water heater.
8. Automatic steam regulator.
9. Temperature indicating and recording instrument.
10. Acid injector.
11. Plug cock.
12. Thermocouple for measuring inlet water.
13. Cone on top of percolator.
14. Tee, 6 inches.
15. Quick opening valve.
15a. Plug cock.
16. Steam gauge.
17. Steam line for top steaming.
18.) Thermocouples.
19.)
20. Bottom cone on percolator.
21. Wort removal line.
22. Thermocouple.
23. Pressure gauge.
24. Steam valve, 1-1/2 inches.
25. Steam valve, ¾ inch for bottom steaming.
26. Lignin discharge valve.
27. Lignin discharge pipe.
28. Cyclone lignin receiver.
29. Wort valve.
29a. Wort sight glass.
30. Plug cock, 3-way.
31. Flash tank.
32. Condenser.
33. Receiving tank for condensed flash steam.
34. Tar "boot."
35. Plug cock, 3-way.
36. Sampling cock.
37) Wort receiving tanks, 250-gallon.
to)
40.)
41 &) Wort storage tanks, 500-gallon.
42.)
43. Vent valve.
44. Cover of percolator.
45. Acid sampling cock.
46. Wort line gauge.

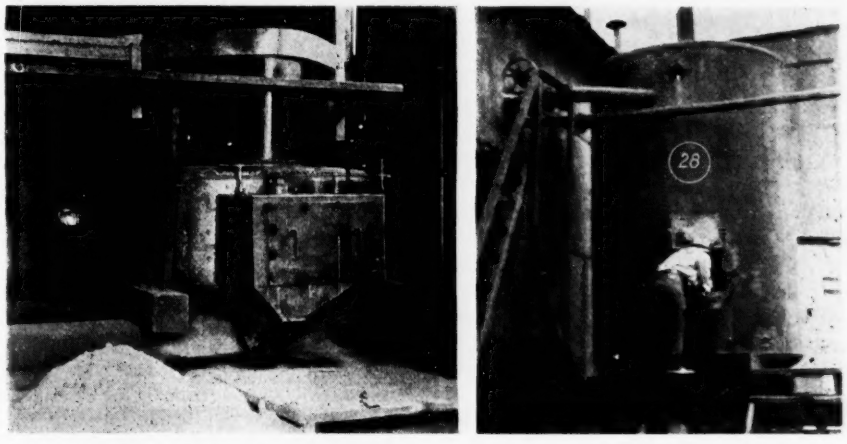
Left: Wort flash tank and steam condenser. Steam from tank 31 passes to the condenser and then into a flash storage tank (33) for measurement. The wort from tank 31 passes through a "tar boot" for removal of solids and then into wort receiving tanks (center).

required are insignificant for the amount of alcohol obtained.

Distillation and rectification present no particular difficulties despite the fact that the concentration of alcohol is 2 per cent or less in the liquor from the fermenters. A mixture of small amounts of fusel oil and furfural is obtained in addition to the rectified spirits; it comprises only 0.7 per cent of the distillate and consists mainly of furfural from the wood pentoses.

An interesting sidelight is the fact that fermentation to butylene glycol or butanol and acetone have also been carried out successfully. The latter fermentation is inhibited by traces of furfural, but it has been found possible to remove the offending substance and obtain good yields of solvents. The pentoses as well as the hexoses are utilized by these organisms, giving conversions of 90 to 95 per cent of the total sugar; and the value of the solvents obtained is considerably higher than that of alcohol.

The equipment design for the process contemplates the use of plate steel of adequate thickness to withstand the operating pressures, lining with high-silicon bronze those portions which are in contact with the liquid before neutralization. Of further interest to the engineer is the extensive use of heat exchangers to conserve steam. The vapor from the hot acid extract is used to preheat the water for subsequent extractions, as is the vapor from the neutralized wort. The pressure from the percolators is employed to elevate the liquid so that the flow through the following stages is by gravity. The liquid is cooled to the proper fermentation temperature by water which is then used for the percolators. This water, as has been mentioned, is further preheated by the vapors of the wort before and after neutralization. The fermented liquor, now at room temperature, is used to cool the vapors in the rectifying columns and is itself preheated, both by the condensed vapor and by the hot spent liquor from the still pots. It is interesting to note that in spite of all these savings, it requires about 100 pounds of 190-pound steam to produce a gallon of alcohol (including the steam required for hydrolysis of the wood).



Lignin dryer (left) and lignin receiver (right). The lignin residue, when dried, was 30 to 40 per cent of the weight of the original dry wood. At present it is used for fuel.

Future Prospects

What effect, we might ask in conclusion, will this process have on the future? Or conversely, what effect will the future have on it? The usefulness of this process, like that of all others in the chemical industry, depends on interrelationships with other processes and on unpredictable economic circumstances. Its contribution to the total supply of alcohol will be inconsiderable for several years at least, and it is in no position to compete with other established sources of supply under normal conditions. It is also quite possible that other more attractive uses for waste wood will divert a large portion of the raw material into other channels. The limitations of wood as a structural material have been largely overcome by recent researches on plywood, the manufacture of which is attended by very little waste; and there is reason to believe that plywood manufacture will replace the more wasteful lumbering methods to a considerable extent. New resin-like materials have been developed from wood and paper by impregnation with plastics, and these may become important outlets for wood wastes.

Representatives of the Forest Products Laboratory are of the opinion that wood waste should not have any difficulty competing with grain crops as a source of commercial alcohol "if the farmer gets a reasonable price for his crops." They do admit, however, that there is a question about its being able to compete with "give away" prices for molasses or with alcohol from petroleum gases. To a large extent the economics of the process will depend on whether or not profitable outlets can be developed for the lignin that is obtained as a byproduct.

It is clear that the implications for the future of alcohol from wood sugar pose questions to which only the inscrutable future itself, with its ebb and flow of supply and demand, its peace and war, and its new economies and technologies, can give the answer.

A detailed report of the work of the Forest Products Laboratory and OPRD leading up to the establishment of the plant at Eugene, Oregon, is available as Report No. R1446 from the Forest Products Laboratory, U. S. Department of Agriculture, Madison, Wis. The report was issued in March 1944 under the title, "Hydrolysis of Wood by Percolation with Dilute Sulfuric Acid and the Fermentation of the Resulting Wood Liquors."

RUBBER REPORT NO. 6 Sees Program Near Completion

SUBMITTED BY RUBBER DIRECTOR BRADLEY DEWEY at the same time he recommended dissolution of his office, Progress Report No. 6 places on record the completion of one of the great chemical production achievements of all time. Because of the length of the complete report, only those parts of most interest to the chemical industry are presented here. It has been announced that a later report will give data on costs and operating efficiency of the plants.

DURING the second quarter of this year, 209,004 long tons of synthetic rubbers were made. This was at the approximate rate of 836,000 tons per year. Of these, 186,035 tons were Buna S. During the first half year, a total of 376,087 tons of synthetics were produced, 315,452 tons were consumed and the inventory of synthetics rose during the first half of 1944 from 43,860 tons to 104,495 tons. This resultant inventory is 33,088 tons higher than was anticipated at the start of the year, and the increase is due entirely to inability of rubber goods manufacturers to consume as much as had been estimated should be consumed.

Status of Synthetic Rubber and Allied Programs

A. *Construction.* — The primary construction of all of the more than 50 plants in the original Rubber Program for the manufacture of butadiene, styrene, Buna S, Neoprene and Butyl, has been completed and the plants are operating. A 14,000 ton per year capacity expansion of the Neoprene plant at Louisville, Kentucky, is under way and will be completed late in December. Secondary construction incident to the providing of additional steam, water purification units, by-product recovery systems, etc., are under way at many of the plants, but in most cases the components for them are already on the ground and they will be completed within the next few months without serious interference with any other important programs.

A privately financed 10,000 ton per year butadiene plant has been approved and is under construction at Bishop, Texas. This plant is being built by the Celanese Corporation of America using the aldol process and will employ petroleum gases as the basic raw material. It is expected that this unit will be in operation by the early part of next year. Pilot plant work indicates that the process will operate satisfactorily and produce butadiene at low cost.

B. *Costs.* — A supplementary report to be published in late August, will give some of the more pertinent data on the costs of construction and the operating efficiency of the plants. It will also give data as to proven and estimated postwar costs of the resultant products.

C. *Production.* — Based on experience gained to date and the present requirements and supply picture, it now appears that the production of butadiene by various processes in 1944 will be as shown in Figure 1. This chart reflects the effect of a diversion of butylenes to the aviation gasoline program during July and August. This diversion—made possible by the demonstrated over-capacity of the butadiene-from-alcohol plants and the availability of alcohol—was agreed to in order to help fill the emergency requirements of Army and Navy aviation resulting from the flying of more than originally forecasted missions over Europe. During the 4th quarter, it is planned to curtail production of butadiene from alcohol since it is expected that the butylenes will no longer be critically needed by the aviation program and the manpower situation in the rubber goods manufacturing plants will govern the amount of synthetics that will be needed. Obviously, with the butadiene from alcohol costing about five times as much as that from butylenes, only the great need for aviation gasoline justifies any but a minimum use of butadiene from alcohol.

The actual and estimated production of Buna S, Butyl, Neoprene, and Buna N from January 1943 through June 1945 is shown in Figure 2.

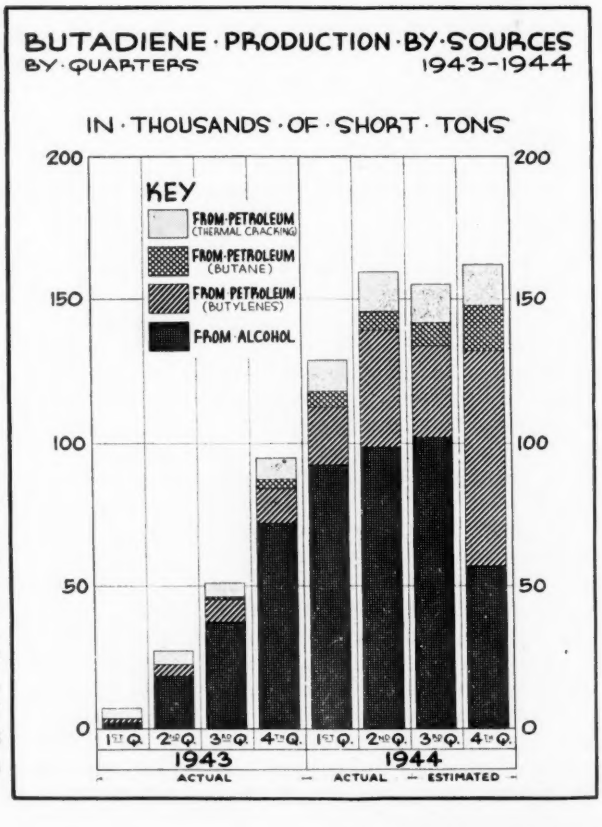
D. *Allied Programs.* — Assurances received from those responsible for supplies of tire cords, carbon black, etc., lead to the conclusion that unless the manpower situation in the rubber goods manufacturing plants improves faster than now seems probable, supplies of these materials, though short, will be adequate for the production programs now contemplated.

Conversion to Synthetic Rubber Program

The conversion program can only be considered finished when the minimum requirements of crude rubber are no greater than the income of this commodity. Large sizes of truck and bus tires and military tires including aircraft are consuming at present more than 60% of the crude rubber that is being used. The projected conversion schedule calls for continued reduction of crude rubber in these sizes. However, even in the ultimate program a large percentage of use of crude rubber will still be in these tires.

Tires and tubes required by the Ordnance Department are 82% converted to synthetic. The conversions that are planned for the next few months will bring this to 85%. It is the consensus of opinion of those responsible that 86% conversion to synthetic will be the optimum that can be accomplished. The actual monthly consumption of crude rubber for Ordnance items is estimated at 3,230 tons per month during the third quarter, and 2,438 tons for the fourth quarter. The only Ordnance products other than tires that require large quantities of crude rubber are tracks and

Figure 1



bogies for tanks. These had been converted mostly to synthetic, but experience in combat resulted in changes of vehicle design which has necessitated a temporary return to the use of crude rubber.

Satisfactory progress has been made during recent months on aircraft items including tires and tubes. The program which is outlined for the next three months will bring the entire aircraft program close to the ultimate goal.

Military and essential civilian tires and tubes, tracks and bogies for tanks and fuel cells for aircraft consume approximately 85% of the crude rubber that is being used. Military items such as special types of wire and cable, hose, medical and drug sundries and proofed fabrics for specialized uses require most of the additional crude rubber that is being allocated. There are a few items where no synthetics now available have been found adequate, but in most instances a conversion program is under way.

The consumption of crude rubber during the first half of 1944 was well within the estimates of our conversion program. The conversion schedule which is projected for the last six months of 1944 can be accomplished without seriously affecting production or performance of products. Assuming that there is no failure to carry out the conversion program that has been projected, and that this country receives the quantities of crude rubber that have been promised, this nation will be able to live within its income during 1945. However, despite the above it must be realized that to a limited extent in some products we are sacrificing quality and quantity in order to conserve crude rubber. The availability of a greater amount of crude rubber would, therefore, at this time enable us to turn out greater quantities of rubber products with existing equipment and manpower.

Manpower

Progress Report No. 5 stated, "Manpower continues to be a serious problem throughout the industry and the achievement of maximum production of rubber products is being impeded by manpower shortages in certain critical labor areas." This is doubly true today. *Manpower is the unsolved problem.* The present production of finished rubber goods is and will be controlled by available manpower and the productivity of labor now on the job.

Recognizing the seriousness of this situation the War Department has arranged for the return from the Army of certain heavy duty tire makers over 30 years of age still in this country. The Inter-Agency Committee on Occupational Deferments has recognized the needs of the rubber industry. The industry has moved a considerable amount of production out of critical labor areas into other less critical areas. The Army has cooperated with drives to help reduce absenteeism and leaders of management and labor are working towards the greater efficiency and productivity which only their efforts can realize.

ESTIMATED SYNTHETIC RUBBER PRODUCTION* OF BUNA S, BUTYL, NEOPRENE AND BUNA N BY QUARTERS, JANUARY 1943 – JUNE 1945

*INCLUDES CAPACITIES OF PRIVATE PLANTS

	1943					1944					1945		
	1ST	2ND	3RD	4TH	YEAR TOTAL	1ST	2ND	3RD	4TH	YEAR TOTAL	1ST	2ND	6 MO. TOTAL
BUNA-S	3,102	18,792	56,741	106,146	184,781	145,641	186,035	185,700	195,000	712,376	195,000	195,000	390,000
BUTYL	35	393	364	581	1,373	3,081	3,928	4,560	9,590	21,159	12,430	15,120	27,550
NEOPRENE	4,372	5,853	10,049	13,329	33,603	13,962	14,991	14,250	14,250	57,453	16,250	17,250	33,500
BUNA-N	2,977	3,335	4,063	4,112	14,487	-4,399	4,050	6,550	5,050	20,049	4,850	4,850	9,700
TOTAL SYNTHETIC	10,486	28,373	71,217	124,168	234,244	167,083	209,004	211,060	223,890	811,037	228,530	232,220	460,750

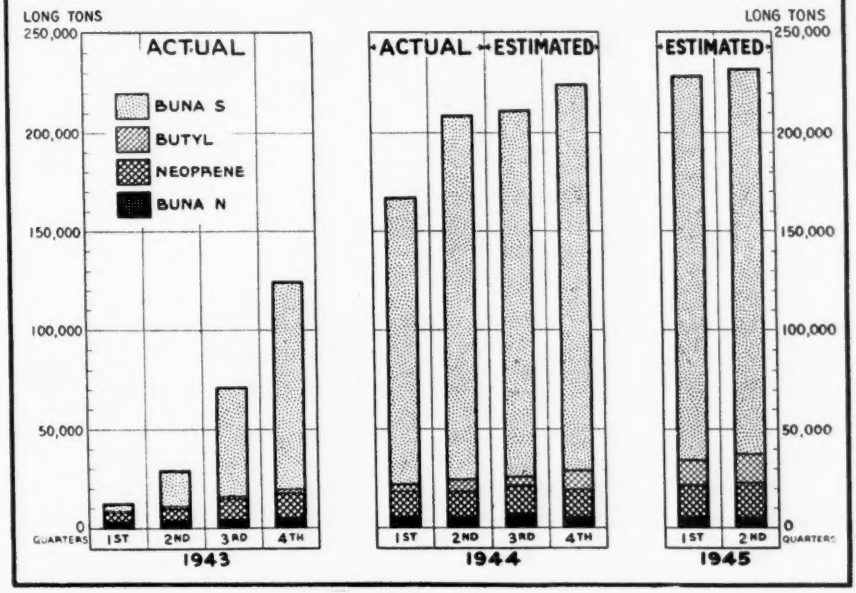


Figure 2

Research and Development

The Akron pilot and evaluation laboratories owned by Rubber Reserve Co. are now being operated by the University of Akron and six pilot laboratories are being built at various copolymer plants. As time goes on it becomes more and more evident that the most important goal of the research efforts must be so to modify Buna S or develop a new polymer that (1) it will evolve less heat, (2) it will not lose so much of its strength at elevated temperatures and (3) when compounded for maximum strength it will have such resiliency that it will permit making tires that not only will heat no more than the old crude rubber tires, but will give the vehicle all of the "soft ride" sought for in the pre-war tire. Four avenues of attack have shown some promise; two considerable promise. Some test tires have been run. Other tires will be made and run in the coming months. This research work should be carried out with all possible vigor, irrespective of any guesses as to when the war may end. Synthetics will be needed after the war. A large part of the synthetic rubber industry must and will live.

Pricing of Synthetics and Crude

This Office is on record that the complications incident to a two price system for synthetics under present regulations should be replaced by a single price system at the earliest possible moment and that this single price system should reflect insofar as possible the probable future costs of the various synthetics. No one type of synthetic or crude rubber should be subsidized at the expense of the others.

Interchange of Information with the U. S. S. R.

For the past year and a half there have been many negotiations looking toward a more complete interchange of information with the Union of Soviet Socialist Republics on the manufacture and use of synthetic rubbers. They have received a general insight into our synthetic rubber industry and have made contracts for technical and engineering plants for the manufacture of synthetic alcohol from petroleum and the manufacture of Neoprene, which does not keep well enough in unvulcanized form to warrant shipping from here. We, in turn, have received some information as to the basic nature of the processes used by the Russians.

Negotiations incident to a possible two-way interchange of more complete information, under conditions which recognize that there is no longer the same need for this information as existed a year and a half ago, have been proceeding slowly.

Production, Employment, Price and Wage Trends in Chemical Industry

IN THE chemical industry, production and wage rates continued to rise during the past twelve months while prices stayed about the same and employment hit a peak the first of the year and then turned downward. These are some of the highlights brought out last month in Statistical Report No. 24 published by the Manufacturing Chemists Association as a supplement to its "Chemical Facts and Figures" of 1940.

Carrying the title "Wage, Hour, Employment, Production & Price Trends in the Chemical Industry as Compared with all Manufacturing," the report is based on official statistics of the U. S. Department of Labor and the Federal Reserve Board.

Compared with general industry, chemicals have shown a greater tendency toward prolongation of the wartime peak in production, employment and weekly earnings of employees, as shown by the charts reproduced below from the report. Chemical plant payrolls likewise have been maintained at top levels, although the average for all factories has dropped more than six per cent since December 1943, the wartime peak. Average hourly earnings continue to rise in all industries. Comparative figures are as follows:

		Chemicals	Drugs	All Mfg.
1939	Jan.	$.780	$.603	$.651
1940	Jan.	.800	.590	.663
1941	Jan.	.822	.614	.689
	Apr.	.839	.611	.768
	July	.886	.636	.744
	Oct.	.921	.639	.770
1942	Jan.	.949	.666	.801
	Apr.	.974	.720	.819
	July	1.004	.717	.850
	Oct.	1.019	.742	.893
1943	Jan.	1.040	.743	.919
	Apr.	1.053	.768	.944
	July	1.076	.766	.963
	Oct.	1.076	.786	.988
1944	Jan.	1.087	.789	1.002
	Apr.	1.097	.795	1.012

Estimated number of wage earners in the industry dropped from 123.3 thousand in December 1943 to 120.2 thousand in April 1944 for a decrease of 2.5 per cent as against a drop of 5 per cent for all manufacturing during the same period. Number of hours worked per week has stayed fairly constantly in the neighborhood of 46.5, whereas all manufacturing has dropped slightly and at last count (April 1944) was around 45.0.

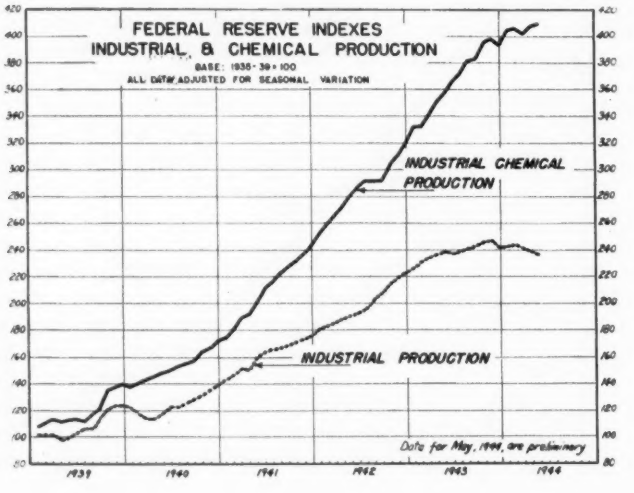
With regard to labor turnover, although chemical industry has never experienced as high a rate as all industry, the figure began to settle down this spring at about 4.5 per cent per month. Turnover for all manufacturing in April was 6.77 per cent. Average turnover in the chemical industry for 1941 was in the neighborhood of 2.5 per cent per month.

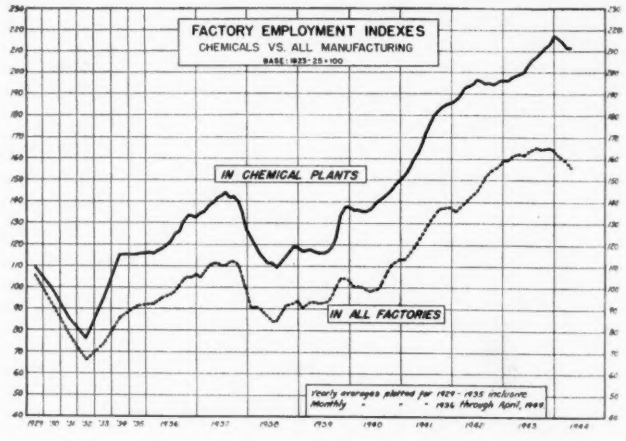
As will be noted from the accompanying chart, chemical prices on the whole have been virtually stabilized over the past two and a half years with the exception of drugs and pharmaceuticals. The tremendous increase shown here, however, is due primarily to the increased Internal Revenue taxes on ethyl alcohol.

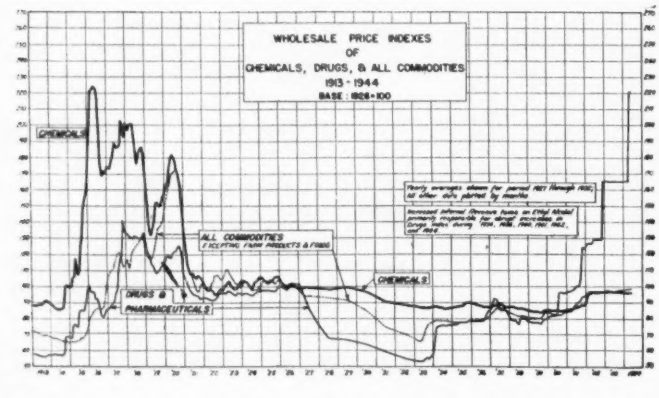
The following comparisons between 1941 and 1944 are based on data contained in the M. C. A. report:

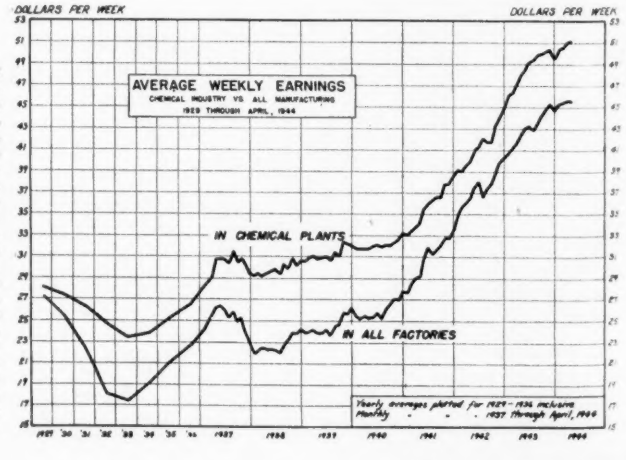
	% Increase from Jan. 1940 to Jan. 1944	
	Chemical Industry	All Industry
No. wage earners	58%	60%
Production index	194%	100%
Payroll index ..	156%	192%

With the exception of the Federal Reserve series, the term "chemicals" as used in the report refers only to the data listed by the Department of Labor under its "chemicals" classification and does not include soap, explosives, petroleum refining, rayon, drugs, fertilizers, cottonseed products, or paints and varnishes. It does include establishments primarily engaged in the manufacture of coal tar crudes and intermediates, finished coal tar products, plastic materials and synthetic resins such as phenolic plastics, casein and celluloid; synthetic, organic and inorganic chemicals, and industrial chemicals by electrochemical and electrometallurgical processes such as carbide, sodium and ferro-alloys.

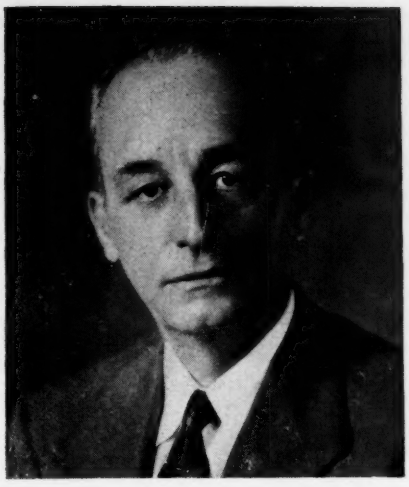








HEADLINERS in the NEWS

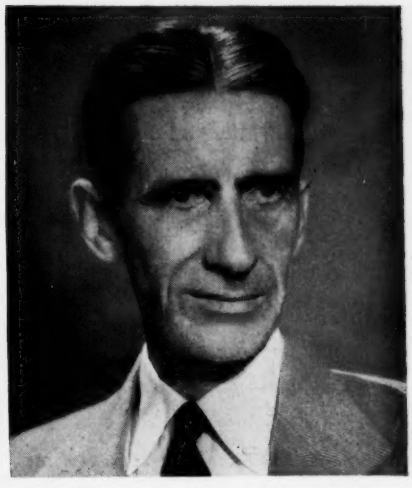


DR. DONALD B. KEYES has been appointed director of the Office of Production Research and Development of the WPB, succeeding Dr. Harvey N. Davis of Stevens Institute of Technology.

BRADLEY DEWEY has been selected to receive the Chemical Industry Medal for 1944. The award is being made to Mr. Dewey by the American Section of the Society of Chemical Industry.

DR. NORMAN SHEPARD, chemical director of the American Cyanamid Company, has been elected chairman of the American Section of the Society of Chemical Industry.

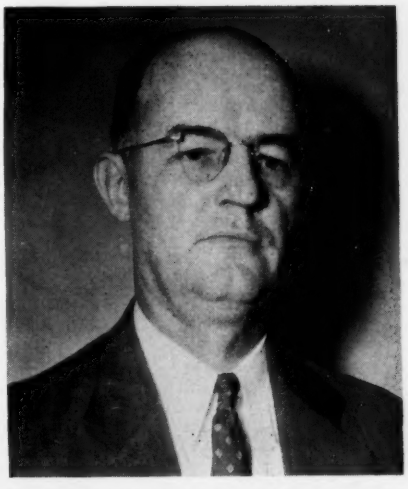
FRANK J. CURTIS, vice-president of Monsanto Chemical Company has been elected vice-chairman of the American Section of the Society of Chemical Industry.



CHARLES J. DUMAS has been appointed manager of the Insecticide Division of Geigy Company Inc., where he will handle activities connected with DDT and other insecticides.

LEON J. WILLIEN, nationally known expert on gas, has been appointed associate director of the Institute of Gas Technology at Illinois Institute of Technology.

CLARK B. KINGERY, assistant manager of Hercules Powder Company's Parlin, N. J., plant has been named manager of the Cellulose Products Dept. plant, Hopewell, Va.



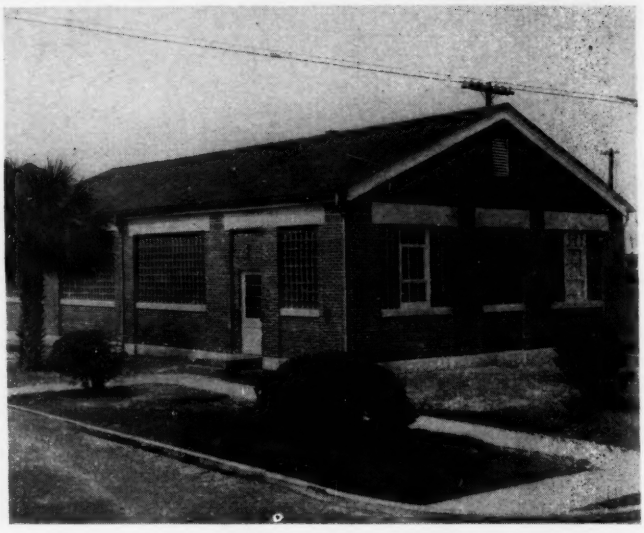
W. ERNEST HENRY will continue as manager of the chemical cotton plant at Hopewell. He has been associated with the chemical cotton industry since the last war.

Hercules Opens New Insecticide Laboratory

A new insecticide laboratory for the biological and chemical testing and control of Thanite has been placed in operation at Brunswick, Ga., by Hercules Powder Company. Thanite, developed by Hercules chemists through research on turpentine and pine oil, is used as a toxic agent in the manufacture of household and livestock sprays.

J. D. Rebstock, who recently joined the Naval Stores Department as an entomologist, after 18 months' service in East Africa has been named supervisor of the laboratory and put in charge of all testing activities.

The new laboratory, shown at right, is of brick construction and contains in addition to the testing chambers and the insectary, an office, a utility room, and a storage room.



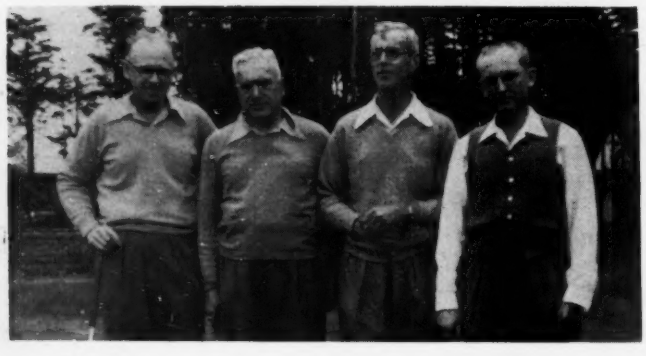
The breeding room where flies are grown for testing in the Peet-Grady chambers is air-conditioned in order to give the flies the best possible living conditions. At the present time the insectary is producing 15,000 flies daily to keep pace with experiments.

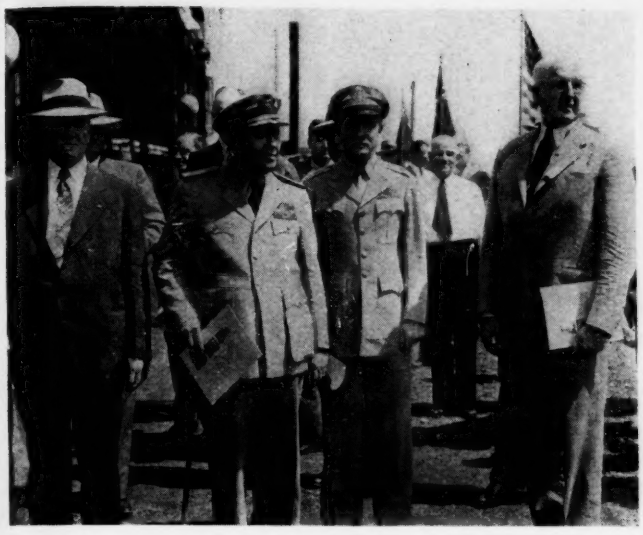
The effectiveness of the insecticide is tested by the Peet-Grady method which consists of placing a definite number of flies in a chamber and introducing a measured quantity of spray. After exposure the numbers of dead and knocked-down flies are determined.

Western Salesmen at Golf

The Chemical Salesmen's Association of California recently held a golf tournament at the Presidio Golf Club in San Francisco. Among the players were, at the right: L. Hockwald, Hockwald Chemical Co.; L. N. West, Wilson & Geo. Meyer Co.; Frank Langlois, Pacific Silicate Co.; Mervin Sinclair, Owens Illiniis Pacific Coast Co.

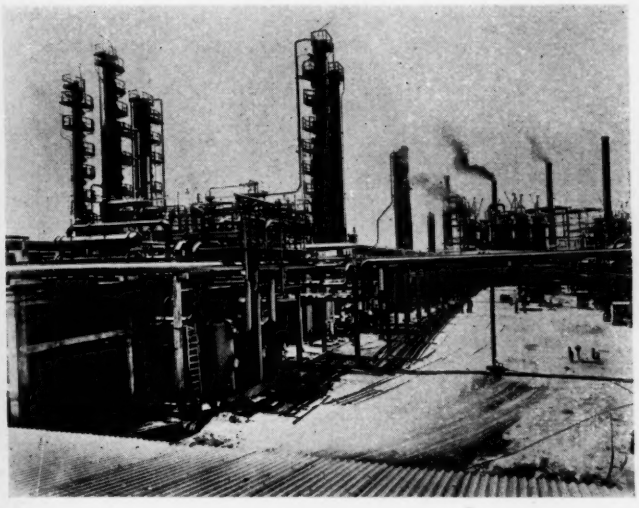
Below, left to right: J. F. Smith, The Dow Chemical Co.; Roy Cole, Tweedy, Cole & DeGraf; S. L. Abbot, S. L. Abbot Co.; L. F. Cummings, Stauffer Chemical Co.; W. Schwartz, L. H. Butcher Co., Los Angeles; L. H. Reyburn, Braun-Knecht-Heimann Co.; E. B. Brown, L. H. Butcher Co., San Francisco; J. A. Bernhard, Westvaco Chlorine Prod. Co.



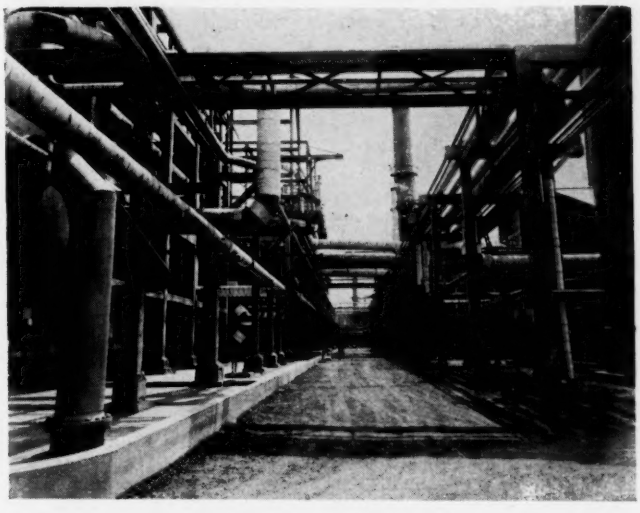


100-Octane Gasoline Plant Dedicated By Sohio

Army and Navy officials joined with leaders of the petroleum industry and Cleveland business at the dedication July 15th of Sohio's new 100-octane aviation gasoline plant, on the hillside overlooking the Cuyahoga valley, where John D. Rockefeller established the company and built its first refinery 75 years ago. Six hundred refinery workers participated in the ceremony. W. T. Holliday, president of The Standard Oil Company (Ohio), at the extreme right in the picture at left escorted distinguished guests attending the dedication through the plant following the exercises. Shown here with Mr. Holliday are (left to right) H. O. Cameron, superintendent, Sun Oil Company, Toledo, Ohio; Rear Admiral Clark H. Woodward, U. S. N., Chief of the Incentive Division; and Brig. Gen. Glen C. Jamison of the Army Air Forces Headquarters Staff.



One of the 75-foot fractionating towers is shown on the extreme right. Gas oil flows from one of these towers into nine catalytic cracking and treating cases, three of which can be seen in background. Light synthetic hydrocarbon gases produced there are processed in a second fractionating tower and at the gas plant which is seen in the foreground on the left.



This driveway through the plant separates the catalytic treating cases, in the left foreground, and the catalytic cracking cases beyond, from the furnaces in which crude oil is heated for processing in the combination unit. Oil lines throughout the new refinery are carried overhead on concrete pipe supports, and are equivalent to 37 miles of 4-inch pipe.

Dupont Executives Take Refresher Course

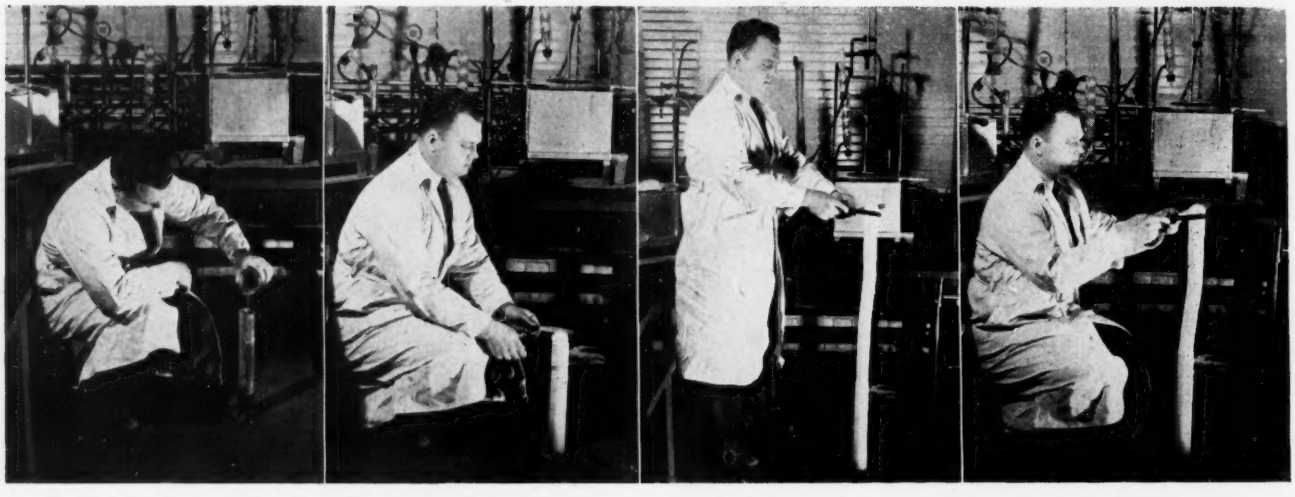
Branch office representatives of the Electrochemicals Department E. I. du Pont de Nemours & Company, take a "refresher" course in metallurgy in the laboratories of the company's plant at Niagara Falls. A group of the representatives is shown in the working togs they donned for demonstrations of the latest techniques for the case hardening and heat treatment of metals. They are, front row, left to right: S. J. Soplop, Niagara Falls; A. Misfeldt, Cleveland Office; John Landy, Advertising Manager; H. L. Alexander, Niagara Falls; C. Schneider, New York; C. C. Rapp, Philadelphia; second row standing, left to right, P. B. McCloskey, of Pittsburgh; R. C. Quigley, of Baltimore; J. F. Spillane, of Boston; E. J. Sears, of Boston; J. J. Cudahy, of New York; N. P. Arnold, of Charlotte, N. C.; J. F. Finnick, of Boston; standing in rear, left to right: W. J. Wood, of Philadelphia; . R. Beach, Jr., of Wilmington; H. I. Hansen, of Chicago; W. Bayer, of New York; J. M. Christie, of Cinn. and C. F. Hamann, of Cleveland.

Foam Plastics For Insulation

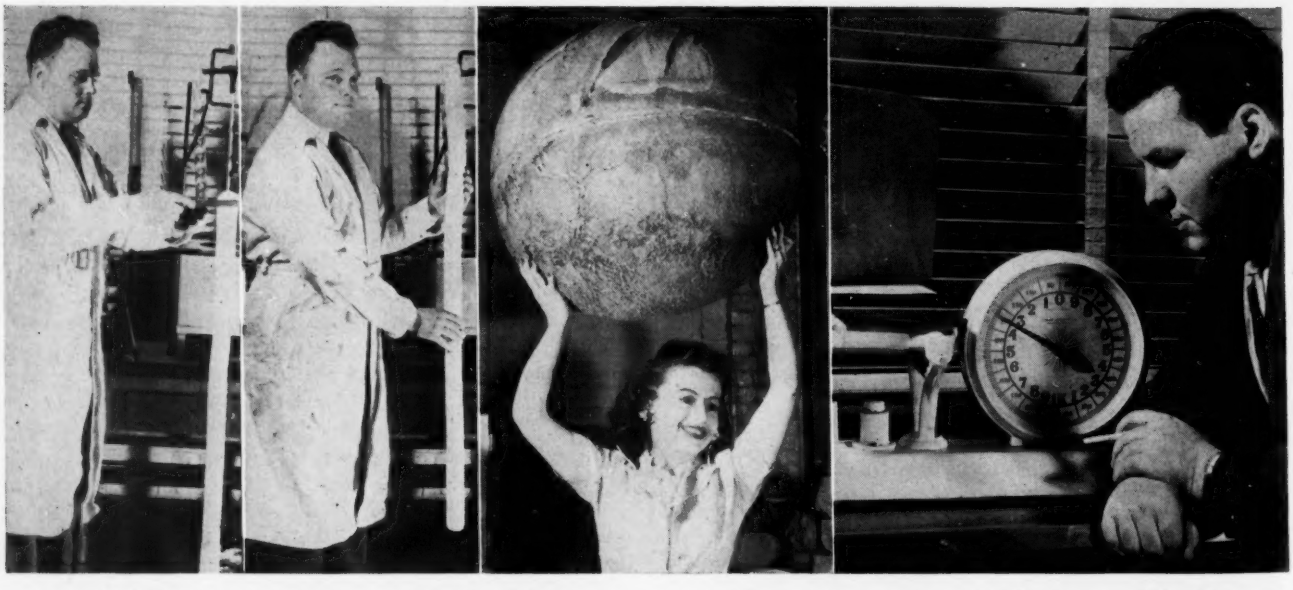
A new type of plastic foam, which is said to be lighter than rock wool, glass or cork and lower in heat conductivity than any of the three, was announced recently by General Electric. Its present uses are secret but according to the company, it promises to have many peace time applications.

An outstanding characteristic of this new development in the company's experimental plastic laboratory is that the material is self-raising and self-curing. In other words the mixture, which resembles molasses, wll begin to foam or expand within two to five minutes after the mixing stops and cures without the application of heat or any other element.

"It just grows all by itself," Dr. J. J. Pyle, director of the laboratory, explained. "It will foam into 30 times its own size, that is, a quart can of the mixture will expand sufficiently to fill a 7- to 8-gallon receptacle in about 10 minutes. What little heat is needed is self-generated by the mixture itself."



In the photograph at top right J. D. Nelson, chemist in G. E. Plastics laboratory, mixes the phenol resin. Above, right to left, he pours the mixture into a glass beaker. Generating its own heat, the material begins to rise in two minutes and continues to rise at the rate of an inch a second. It takes a few seconds to cool and harden and until this takes place the rising column is supported. After the entire mass has foamed, it is taken from the beaker and Mr. Nelson holds the rod of completed foam plastics. In the last two pictures Mrs. Dorothy Barker easily holds a 29-inch sphere of the light-weight foam plastics and Dr. J. J. Pyle, director of the laboratory, weighs a block, 13" x 9½" x 2½". It tips the scales at 350 grams, or about ¾ of a pound.



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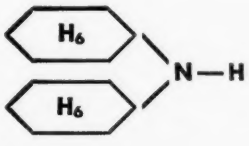

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5. Manufacturing Dyestuffs
6. Organic Syntheses

These suggested uses are for illustration and are not to be construed as recommending violation of any patent.

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While Monsanto Dicyclohexylamine is a thoroughly proved intermediate in various industries, its possibilities are by no means exhausted.

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BETWEEN THE LINES

Disposal of Overseas Surpluses

Disposal of U. S.-owned surplus war materials that are held abroad will constitute almost as big a job as disposal of surpluses at home. The task is in the hands of Foreign Economic Administrator Leo Crowley and some chemical products will be involved, notably protective coatings, fats and oils, detergents, and certain industrial chemicals.

WHILE probable surplus war materials are recognized as an enormous problem in the United States, the disposal of such Government-owned surpluses now held abroad has received little public notice, although offering almost as many complications as the domestic surplus.

Nevertheless, and almost unknown to anybody except the business men and the officials concerned, the parallel foreign surplus disposal issue has been receiving intensive study since early in the year. One of the early moves of Foreign Economic Administrator Leo Crowley, on assuming this post as a sort of trouble-shooter, was to ask a group of qualified business men, serving as a business advisory committee, to suggest the policies and procedure that ought to be followed by FEA when confronted with the actual job of handling such surpluses abroad.

Their recommendations have been before Mr. Crowley since May of this year and are understood to be receiving serious consideration as a basis for action. One fact supporting this indication is that the recommendations in detail have been put in limited circulation, which implies that official and other comments are being invited. Among others, chemical people in Washington have obtained the committee's report and are studying it carefully.

The ramifications involved in orderly and economically sound disposal of any surpluses held by this Government abroad are realizable probably for the first time after seeing this survey and the recommendations that have been made. It is probably safe to say that they equal those surrounding the same disposal problem at home, and in addition have the complication of perhaps involving matters of foreign policy that have yet to crystallize.

"A Valuable National Asset"

First of all, the business committee found that this surplus, however it is composed, should be treated as "a valuable national asset which must be conserved and made to yield for the nation the greatest possible benefits."

The committee pointed out that by the time large quantities of property are available for sale, the framework of policy and an organization to handle the matter should already have been determined. One of the fundamental recommendations is that the machinery for foreign disposal be meshed into the organization for sale of surplus property in this country. Since the latter is now under a separate and potentially very large organization, the Surplus War Property Administration, this suggestion opens up a very important question of coordination.

The committee recommended that disposal of foreign-situated surpluses should be effected through "a Government corporation" which, at the present outlook, would be a subsidiary of FEA. This last is a question that may be settled otherwise, but the outlook now is that FEA, having had jurisdiction over sales abroad and Lend-Lease, will handle the foreign disposal problem.

In line with this reasoning is the statement of the committee that sale of surplus property held abroad should be governed by the foreign policy of the United States. This would be a natural sequence to the present regulation of foreign commerce to conform with the nation's foreign policy.

It probably goes without saying that foreign commerce in the immediate post-war period will be freed of many of the current restrictions, but a great many probably will continue indefinitely. But, as never before, foreign commerce will have to reckon with new factors, among them the amount of U. S. owned goods that may be sold abroad, their character, and to whom they may be sold.

All of these considerations are evident in the background of the recommendations now before FEA. Not only must the goods be sold with due regard for foreign policy, but with equally emphasized regard for the business interests of the United States. Surplus goods should not be allowed to overhang the market and discourage domestic producers, nor should they be allowed to disorganize or jeopardize export markets for American goods. These things the committee has pointed out.

Danger Points

It is possible to read into this situation and its handling many potentialities, none of which may necessarily materialize. First, the Government will own a huge and as yet indeterminable stock of commodities of all kinds: raw materials, chemicals, drugs, pharmaceuticals, durable goods, manufacturing facilities. Some possible chemical items suggest themselves: protective coatings of various kinds, detergents, chemical raw materials, fats and oils, and industrial chemicals of almost infinite types.

Conceivably, an aggressive government policy might seek to use the existence of such stocks as an economic weapon either against business interests at home or to obtain advantages in foreign trade for such home interests, or even to influence international negotiations. This is admittedly speculative, however, and actually the scope of the recommendations now before FEA, while pointing to such possibilities, is limited to practical considerations.

Probably surplus goods will feature in relief and rehabilitation activities abroad and in channels that in all likelihood will not affect the normal trade markets. The present assumption generally is that the owning agencies will continue in custody of goods they held at the close of hostilities, with FEA as a supervisory and managing agent. Thus, it is likely that there will be considerable latitude in administration. In fact, a cardinal recommendation to FEA is for decentralized selling, under highly specialized advisers.

Present recommendations contemplate that all smaller items be disposed of first, and as rapidly as practicable, with larger matters handled in Washington. No inventory count is possible now, for obvious reasons. It is expected that the primary source of surplus property outside of the United States will be the armed services. Considerable delay may be met in locating and declaring surpluses in major war areas, but in those areas from which our forces have withdrawn, or expect to clear out quickly, this will not be the case.

Lend-Lease Surpluses

Another source of surplus supplies is expected to be found in Lend-Lease, in supplies transferred to foreign governments, and also, goods purchased in this country for Lend-Lease use but which have not left the country. Surpluses are expected to arise out of the import program only where the Government has been responsible for procurement. There are some 600 strategic materials imported into this country, but only about 150 of

(*Turn to page 309*)

Sulfa's Unsung Hero...

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AVAILABLE FOR PROMPT DELIVERY IN TANK CAR QUANTITIES BY *"Big Bertha"*

During the past year, enormous quantities of Victor Phosphorus Oxychloride have been required as a chlorinating agent in the production of sulfa drugs, vitamins, and other vitally essential pharmaceuticals.

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Actual demand exceeded expectations and month after month Victor's phosphorus oxychloride plant has operated at far beyond its rated capacity. As a result, additional tank cars were needed to handle the extra production.

Because of increasingly critical war-time delays in transportation, Victor decided to break with precedent. Instead of purchasing more of the standard 3000 to 4000 gallon tank cars, a huge 6000 gallon, reinforced, lead lined, insulated tank car equipped with special heating coils was acquired and put to work.

In the past year, "Big Bertha," as this mammoth tank car is affectionately called, has become a familiar and welcome visitor at some of the most important war plants in the country . . . and quite the opposite of the death-dealing "Big Bertha" of World War I, has played an important role in saving many human lives through the wonders of medicine.

For years Victor Chemical Works has specialized in phosphates, formates, and oxalates . . . today is the world's leading producer of these compounds. During these years it has been our privilege to help industry solve many important problems with phosphorus compounds, formates and oxalates. May we serve you, too?

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NEW PRODUCTS & PROCESSES

Polethylene Plastic Achievement by Carbide

The Navy Department has now given Carbide and Carbon Chemicals Corporation permission to reveal its remarkable production record of polyethylene plastics, component of coaxial cable used in radar equipment. In a little more than two years from the date the corporation was given the assignment, Carbide is producing the Navy's requirements for polyethylene at a rate 600 per cent of the designed capacity of the plant.

These polyethylene plastics are inherently flexible, translucent materials that possess many unusual properties. They are entirely new materials, unique in the plastics field as well as in the industrial field. These plastics have excellent insulating properties. They are tough and resistant to shock. The amount of water they will absorb is inappreciable, while films of the material will not permit the passage of appreciable amounts of water vapor. In addition, polyethylene softens at the unusually high temperature for thermoplastic materials of 230 deg. F., above the temperature of boiling water, and remains virtually unaffected by temperatures 90 degrees below zero, Fahrenheit.

A little over two years ago, the U. S. Navy learned that the Carbide and Carbon Chemicals Corporation, in collaboration with an associate company, The Linde Air Products Company, had developed a high pressure synthesis of a new material, Polyethylene, and it was found that this material was suited to meet the Navy's requirements of an insulation for coaxial cable used in radar equipment.

At the Navy's request, these two companies, working toegther, designed in their own Engineering Department and built with their own Construction Organization, a plant to produce polyethylene by a process different from any other commercial polyethylene process. Within thirteen months from the rate the project was authorized, this plant was producing at 180 per cent of rated capacity.

One year after the plant commenced the production of polyethylene, a component of radio cable essential to the efficiency of electronic communications units and, therefore, vital to the success of naval operations, production for the year equalled 240 per cent of the rated output for the facilities.

Today, approximately two years after Carbide was given the assignment, this plant is producing polyethylene at 600 per cent of rated capacity and is providing the Navy's requirements of this material for use in coaxial cable. Polyethylene plastics are produced under strictly controlled conditions. By changing the conditions of manufacture, the properties of the base resin can be varied to satisfy the needs of particular applications. At the present time only one grade of resin is being produced. Among the properties which can be varied are tensile strength, elongation at break, tear resistance, and brittleness temperature. The properties of the resin indicate that the use of these materials in future years will be extremely widespread. Because they are colorless as manufactured, the resins can be produced as clear translucent articles or can be formulated in a wide color range offering exceptionally high luster. The plastics are so light that they will float on water. They can be processed by the methods now employed for the older types of thermoplastic materials. They may be extruded, molded, fabricated into sheets and film, and coated on to cloth.

All types of polyethylene plastics are distinguished by a dielectric constant at 50 mc. of 2.29 and a power factor of 0.0003; low water absorption (0.03 per cent weight gain in 100 hours), and low transmission of water vapor; and resistance to attack by many chemicals, including a number of solvents. As these materials are inherently flexible, the use of a plasticizer is unnecessary. The excellent electrical properties of the resin are of primary importance in present-day uses and suggest many applications when greater quantities are available. Their chemical inertness, low moisture transmission, inherent flexibility, and toughness indicate that the resins will be used in the manufacture of many products such as washers, gaskets and other molded articles; films; coated fabrics and paper; collapsible tubes; tubing; filaments; and other similar articles.

New Tackifier for Synthetic Rubber

The development of a new tackifier and extender for synthetic rubber has recently been announced by the Heyden Chemical Corporation. This compound which is marketed as Pentacizer 344 is now commercially available. Pentacizer 344 is a brown, resinous friable solid. It is soluble in ketones, aromatic hydrocarbons, vegetable oils, mineral oils and synthetic rubbers. Investigations have shown that the use of up to 40% of Pentacizer 344 will tend to soften and tackify the synthetic rubbers, especially GR-S. The tack will remain to a considerable extent after vulcanization. When less than 25% Pentacizer is used, the uncured stock will possess considerable tack but the cured rubber will not be sticky and will maintain good nerve.

Alcohol-Soluble Polyamide Resins

A new group of alcohol-soluble resins, known as Polyamide Resins Series ED and DET are now in commercial production, according to an announcement from General Mills, Inc. The ED series, made by reaction of the dimerized and trimerized linoleic and linolenic acids of soybean oil with ethylene diamine, are hard, dark amber colored products capable of hot melt or solvent application. Their widest use to date is in the manufacture of heat sealing, grease resistant coatings for food containers and label adhesives. They are also finding application in protective coatings for wood and metal, binders, gaskets and can sealing compounds where their alcohol solubility, fusibility, thermal stability, and grease and alkali resistance can be used to advantage.

The ED series resins are available in three forms, Hot Melt Compounded, Hot Melt Uncompounded, and Solvent Type Uncompounded. The Solvent Type is dispersible up to 45% solids in commercial absolute isopropyl alcohol, normal butyl alcohol, and in mixtures of these alcohols with petroleum naphthas, benzene or toluene. The Hot Melt Compounded form is designed for hot melt application to glassine, waxed glassine and similar papers where a rapid heat-sealing, grease and moisture vapor resistant film is desired. The two uncompounded forms are available to users who may desire to formulate them according to their own particular needs.

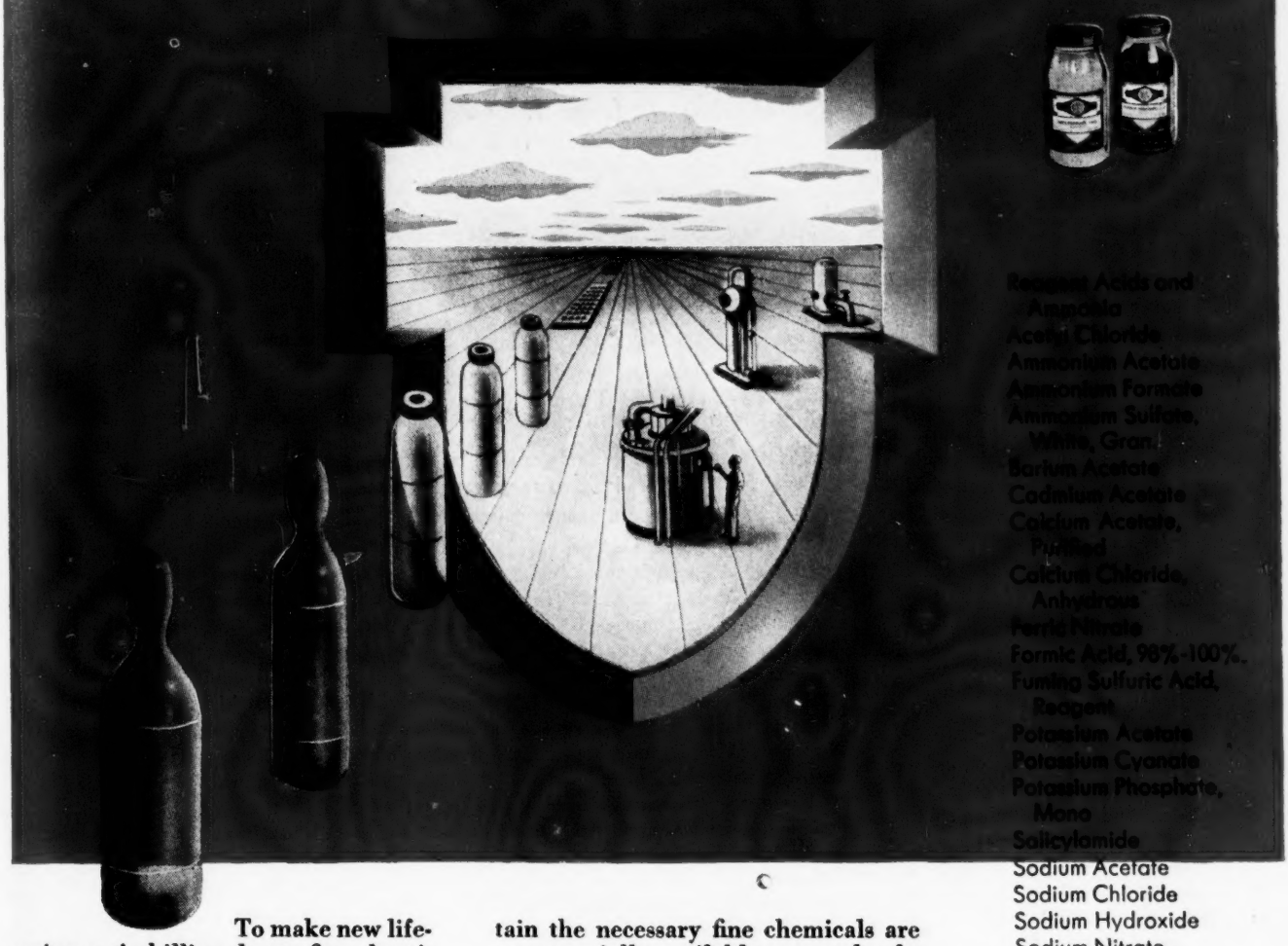
The Polyamide Resins, Series DET, are thick, viscous adhesives available in a range of viscosities. Like the ED products, they may be applied as hot melts or may be dispersed in isopropyl or butyl alcohol. This series is made by interaction of diethylene triamine with the dimerized and trimerized linoleic and linolenic acids of soybean oil. Both series of resins are compatible with rosin, Staybelite, Staybelite Ester #10, Santicizer #8, and fatty acids. They are insoluble in lubricating and vegetable oils.

General Mills gives full credit to the Northern Regional Research Laboratory, Bureau of Agricultural and Industrial Chemistry, Peoria, Illinois, for the development of the Polyamide Resins which were first produced by the Peoria laboratory under the name of Norelac.

Improved Copper Plating Process

An improved high-speed copper plating process which reduces operating costs and speeds up production rates is an-

New Drugs NEED B&A FINE CHEMICALS



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Ferric Nitrate
Formic Acid, 98%-100%.
Fuming Sulfuric Acid, Reagent
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To make new life-saving, pain-killing drugs, fine chemicals are required. Baker & Adamson's long experience in the production of such chemicals embraces hundreds of reagent grade products used in the most exacting analytical work. This extensive manufacturing "know how" assures high standards of purity, strength, and uniformity.

If you are working on a new process or a new drug, you'll want to be certain the necessary fine chemicals are *commercially* available or *can be developed* for you. Remember—B&A's diversified production facilities are readily adaptable to special requirements. Baker & Adamson may even be able to save you some early steps in your operations. For information, call the B&A Technical Service Office nearest you. Listed here are some of the B&A fine chemicals available to drug and pharmaceutical manufacturers.

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nounced by E. I. du Pont de Nemours & Company.

This improvement is a development of the copper-plating process introduced by the Electroplating Division of the company in 1938. The original method plated heavier deposits of copper in a shorter time than had before been possible. It utilized a carefully compounded and controlled sodium copper cyanide bath operating at 100 per cent current efficiency and at increased current densities.

The new gains were achieved by working out a method of substituting potassium cyanide and other potassium salts for the sodium salts formerly used with still further increases in current densities. Development of methods for producing the potassium salts in this country, and technical advances in their use in plating baths, made the substitution possible.

War plants already are operating installations of the new process. Makers of tanks, planes, motorized equipment and other military and naval items have adopted it for plating the numerous engine parts and other articles in which the use of copper is essential.

Of major importance among war applications of copper plating is its use as a stop-off or mask in selective case hardening of steel parts to increase wear resistance. This allows certain portions of machine parts to be hardened to resist shock or wear, while the copper-masked sections are left softer and tougher.

Copper is likewise valuable as a corrosion-resistant plate and as an undercoat for decorative finishes such as nickel and chromium. The ease with which it can be buffed compared to steel cuts costs and speeds up production of highly polished articles.

Vapor Phase Oxidation of Ethylene to Ethylene Oxide

A process has been developed by the National Research Council of Canada for the vapor phase oxidation of ethylene to ethylene oxide, in the presence of methane or ethane, with air, over a new type of silver catalyst.

Heretofore, it is claimed, catalytic oxidation of ethylene to ethylene oxide has been successful only when substantially pure ethylene was used as the feed. The new method makes possible the use of readily available hydrocarbon fractions such as oil refinery absorber residue gases, containing as low as 10 per cent ethylene, without the necessity for the costly isolation of ethylene therefrom.

The critical problem in ethylene oxidation is control of the temperature of the catalyst surface in order to prevent complete oxidation to carbon dioxide and water; a problem which is even more acute in methane-ethane-ethylene mixtures. However, the recently developed process renders possible close temperature control of the new type of catalyst, and the addition of controlled amounts of ethylene dichloride to the reactor feed suppresses the oxidation of the paraffins and makes possible the economical production of ethylene oxide.

The process has been successfully tested on a laboratory scale at a Canadian refinery over a seven month period. A pilot plant to produce 200 pounds per day of ethylene oxide is now being designed.

Cyclohexanols from Wood

A process patented recently in Canada outlines a method of manufacturing cyclohexanols from wood waste or similar lignin-containing materials.

In essence, the process embodies the suspension of wood meal in dioxane, adding a copper chromium oxide catalyst, and subjecting the mixture to the action of hydrogen at an initial pressure of 2500-4000 pounds and at a temperature of 240-280 Centigrade. The cyclohexanols so formed are recovered by distillation.

New Process for Ammonium Chloride and Sodium Sulfite

Canadian Industries Ltd. has just revealed the development by its Research Department of a new process for the manufacture of ammonium chloride and sodium sulfite. The process, based on extensive phase rule studies, has been utilized commercially by C. I. L.'s Hamilton (Ontario) plant for some time and has proved to be more economical than conventional procedures.

Essentially, the method entails passing sulfur dioxide and ammonia into an ordinary brine solution, with the consequent formation of ammonium chloride and sodium sulfite. The latter precipitates out and the ammonium chloride may be readily recovered from the mother liquor, prior to recycling.

The new process effects savings even though potassium cyanide is costlier, pound for pound, than sodium cyanide. A smaller amount of the potassium salt suffices to maintain the plating bath at the required strength, and dilute solutions in the new process give results that are equivalent to much stronger concentrations in the old.

Desired thicknesses of deposit are now acquired in an even shorter plating time. This is made possible by the greater current densities tolerated by the new bath. The higher the current density—number of amperes per surface unit of items under treatment—the more rapid the rate of copper deposition. The new bath is also more stable and easier to rinse.

Urea for Cattle Feed

A new material containing urea, designed especially to supply some of the crude protein equivalent in mixed feeds for cattle and sheep, is now being allocated to feed manufacturers, the Du Pont Company announced recently.

This new product, which has been given the name "Two-Sixty-Two" Feed Compound, can effectively replace part of the hard-to-get protein supplements, such as linseed meal, in the ration of ruminants. In fact, the War Production Board has for some months been allocating crystal urea to manufacturers for inclusion in their feeds for ruminants, thus aiding considerably in the solution of the critical wartime feed problems created by acute shortages of the usual protein supplements.

Numerous experiments as well as practical feeding experience have demonstrated the efficiency of urea for this purpose. Because crystal urea tends to take up moisture and subsequently dry out into a hard mass, difficult to handle, the Du Pont Ammonia Department has conducted considerable research in its own laboratories to develop a special free-flowing urea base feed compound for exclusive use in feeds for ruminants.

"Two-Sixty-Two" feed compound gets its name from the fact that it supplies 262 per cent crude protein equivalent. Every pound therefore has nitrogen equivalent to 2.62 pounds of crude protein. The new feed compound has a light gray color and free-flowing characteristics. It is therefore easy to handle and mix with other feed ingredients.

Livestock nutritionists explain that urea is not used directly, but is rapidly changed to ammonia in the paunch or rumen of the animal. This ammonia is then used by the micro-organisms growing in the feed mass within the rumen. The protein produced by these micro-organisms is later utilized by the ruminant. That is also why urea in the feed of non-ruminants such as horses, swine, and poultry, is of no value.

Food Preservative

A new chemical of vegetable origin with a capacity for preserving the sweet flavor of foods containing either animal or vegetable fats has been announced by the Wm. J. Strange Co. The full name of this new product is Nor-di-hydro-guairetic Acid which has been given the shorter designation, N.D.G.A.

N.D.G.A. is a chemical entity or pure chemical compound extracted from Larrea Divaricata or creosote bush which is a type of low, scrubby vegetation growing wild in semi-arid regions of our western states. It has a white, crystalline appearance similar to that of granulated sugar.

According to the company many applications will be found where N.D.G.A. will be beneficial. Already approved by the U. S. Department of Agriculture as non-toxic, and approved by the Department's Bureau of Animal Industry for use in lard, many large producers of

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foods, pharmaceuticals and related products are claimed to be finding new uses for N.D.G.A. with beneficial results. For the duration of the war, all N.D.G.A. produced will be reserved for use in foods for the armed forces who have encountered serious difficulties in transporting to all parts of the world foods containing fats or oils and in having these foods reach the front lines in good condition.

N.D.G.A. was discovered, developed and tested at the University of Minnesota where for many years an intensive study of the properties of plants used by American Indians has been under way. Substances which prevent rancidity in fats or oils, where oxidation is the causative factor, have been found in approximately fifty of such native wild plants. So far, N.D.G.A. shows the most promise and is said to lead the field of permitted antioxidants by a wide margin.

Scientists of the University of Minnesota, Department of Pharmacy, recognized N.D.G.A. as an anti-oxidant as soon as the chemical had been isolated and its formula written on paper. It was fortunate and curiously coincidental that specialized and contemporary research work in anti-oxidants for food-stuffs was being conducted by the Geo. A. Hormel Foundation at the University of Minnesota at the time N.D.G.A. was discovered. Collaboration by the two research staffs resulted in the successful outcome of the undertaking.

pH Buffer Tablets

Coleman certified buffer tablets are now offered by Burrell Technical Supply Co. as a comprehensive line of exactly compounded solid buffers, covering the region 2.0 to 12.0 pH in steps of 0.20 pH.

From these fifty different formulas it is possible to select the exact pH value with the supplier's assurance that the resulting buffer will be correct to within 0.02 pH.

A certified buffer solution is prepared by dissolving one certified tablet in 100 ml. of warm, distilled water.

Certified buffer tablets are packed 12 per glass vial, protected by a hermetic wax inner seal and a bakelight screw cap. Each vial is labeled with full instructions for use and with the pH clearly indicated.

New Electrode for Aluminum Welding

The Eutectic Welding Alloys Company, New York, has announced a new electrode which according to the company can be used with great ease in the welding of aluminum sheet and castings. It is possible, with this new electrode, to add metal without completely preheating the casting, and particularly without danger of overheating the metal adjacent to the weld. The operation is extremely rapid, thus very economical and renders the salvage of defective castings a simple procedure.

The new rod has been used in the addition of metal on faulty or improperly machined castings, overlaying of surfaces which have been improperly cast, filling of "low spots," changing of aluminum patterns already machined, filing of faultily-drilled holes, filling and overlaying of porous castings, and welding of casting to aluminum sheet.

Another field of application for this new electrode is in the joining of aluminum sheet. The extremely high rate of fusion of the rod produces a smooth, strong, homogenous fillet with great speed, avoiding distortion and stresses. Joints can be obtained which are entirely leak-proof and, which are machinable and show high tensile strength comparable to the parent metal.

The rod is shielded with a special coating which permits its application even without preheating. It insures an even and rapid flow of metal and the slag can be removed by simply wire brushing the weld. EutecTrode 2100 is a high aluminum and low silicon composition which alloys itself to practically every type of aluminum.

Methanol Solutions Control Growths on Fruit Trees

Chemical research has found a new and effective way to control crown-gall, those rough, woody disease growths that weaken and often kill almond, walnut, peach, plum, apricot, and other trees and vines, according to an announcement by E. I. duPont de Nemours and Co., Inc.

Pure synthetic methanol is an important ingredient in two new chemical solutions now recommended for this purpose. Use of the solutions also saves considerable painstaking manual labor normally required to eliminate these unsightly swellings. Heretofore, it has been necessary to chisel or cut them out and to disinfect each wound thus created.

The current issue of the Du Pont "Agricultural News Letter" reports that the latest recommendation, made by Dr. P. A. Ark, of the California Agricultural Experiment Station at Berkeley, following several years of testing under actual orchard conditions in his state, simply calls for exposing the gall, cleaning with a brush, and painting the entire surface with one of two mixtures. The first contains 1 part sodium dinitrocresol and four parts of methanol; the second, 100 parts by volume of methanol, 15 parts glacial acetic acid, and 12 parts by weight of crystal iodine.

Glyceryl Monostearate in Bead Form

The Beacon Company of Boston, Massachusetts, have announced the availability of "Bemul"—a pure white, edible glyceryl monostearate in bead form which is completely dispersible in hot water. It is also said to be completely soluble in alcohols and hydrocarbons (hot). It has a pH (3% aqueous dispersion at 25°C) of 9.3 to 9.7 and melts at 58° to 59°C (Capillary Tube). It is claimed to be non toxic and practically odorless. Because of its non-toxicity, high purity and freedom from alkalies, according to the company statement, Bemul should be of particular interest to manufacturers of cosmetics, pharmaceuticals and foodstuffs (including paste emulsions of edible oils, shortenings, cooking oils, fats, etc.). In addition to its use as an emulsifying agent, it improves the smoothness, whiteness and grain of shortenings and similar products, as well as reducing the amount of shortening necessary. It also forms a protective coating for edible hygroscopic powders and similar crystals and tablets which absorb moisture from the air, have a tendency to lump, cake and decompose, or deteriorate, on standing. The product also can be used as an emulsifying agent for waxes, oils and cream polishes, as a pour point depressant for lubricating oils, as a constituent of textile sizes (particularly for rayon and silk), as a lubricant for paper and cardboard in dry die-forming, as an emulsifying agent in the polymerization of synthetic rubber (also to prevent tacking between sheets of rubber), as a protective (dip or spray) anti-oxidant coating for metals, and as a preliminary binder for clays, abrasives, etc., prior to firing.

Coated Fabrics as Artificial Leather

Celanese Corporation of America recently was granted patents relating to coated fabrics such as artificial leather.

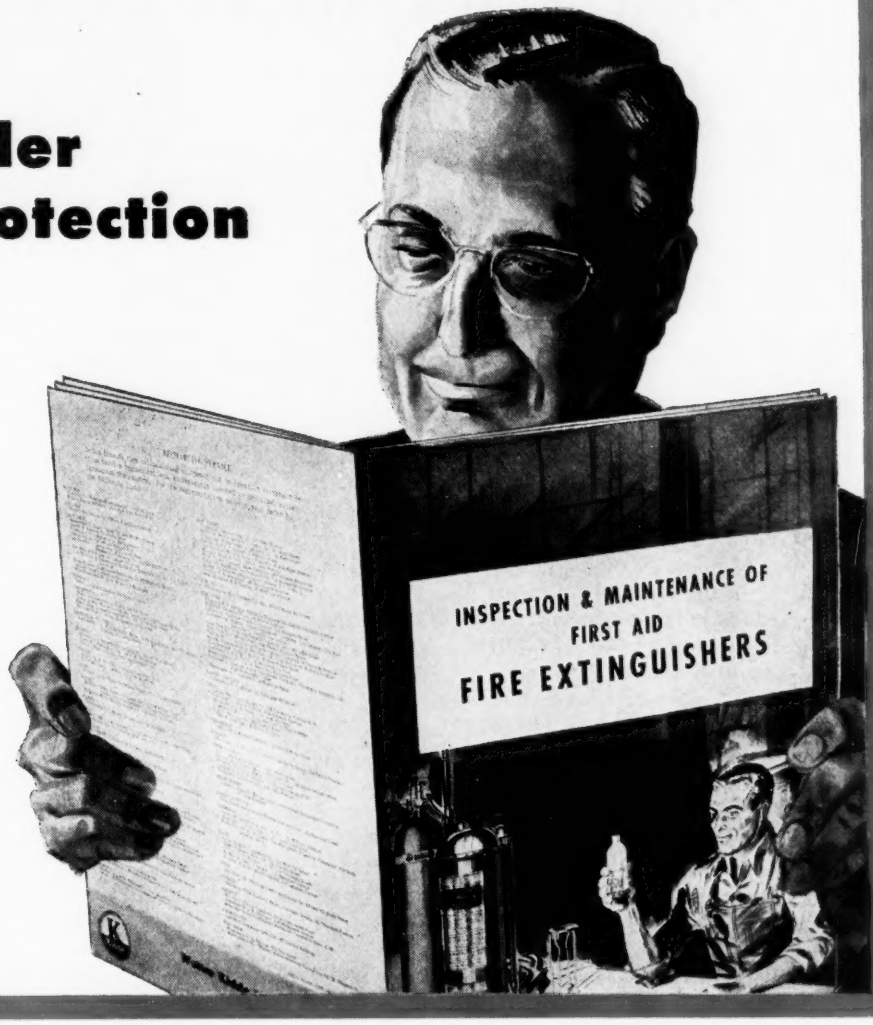
The novel coated material of this patent comprises a fabric base containing doubled yarns of filamentary cellulose derivative material, such as cellulose acetate, and filamentary material of non-plastic nature. Bonded to this fabric is a coating composition comprising a cellulose derivative, such as cellulose acetate.

The resultant coated fabric is characterized by having an improved bond between the fabric base and the coating, and is eminently suitable for use as artificial leather.

Longer Life, Brighter Phosphorescent Pigment

A new phosphorescent pigment, which emits a brighter phosphorescent afterglow for a longer period of time than similar long-afterglow pigments, was recently announced by The New Jersey Zinc Sales Company. This pigment (designated CaS-SrS-2470) is specifically intended for use in such wartime applications as phosphorescent paints, marking tapes and decalcomanias.

First reader in fire protection



Free book tells how to keep extinguishers in fighting form

Make sure *your* fire-fighters will always be ready to nip blazes before they get out of hand. Regular inspection is the only safe way.

This new book, issued by Walter Kidde & Company, will help you set up your own maintenance system. It covers all types of equipment, gives exact instructions for examining and re-charging. Write for your free copy today! Just ask for "Inspection and Maintenance of First Aid Fire Extinguishers."

CHAPTER HEADINGS INCLUDE:

- WHO'S IN CHARGE?
- KEEPING RECORDS
- MARKING THE EXTINGUISHERS
- INSPECTION OF EXTINGUISHERS
- VAPORIZING LIQUID EXTINGUISHERS
- CARBON DIOXIDE EXTINGUISHERS
- SODA-ACID EXTINGUISHERS
- FOAM EXTINGUISHERS

WALTER KIDDE & COMPANY, INC., 140 CEDAR STREET, NEW YORK 6, N. Y.

NEW EQUIPMENT

New Type Gas and Liquid Separator QC 429

The use of compressed air and gases in the process industries has a new ally in a revolutionary new principle for the automatic and continuous removal of condensate (droplets, slugs, or mist) which is announced by Sales Corporation of America, Philadelphia—and which is embodied in a new family of "Liqui-jectors," adaptable to air and gas lines up to 1¼" pipe size and normal line pressures. No moving parts are involved, and no cocks, traps or shutoffs are required in the drain line (which is open to the atmosphere). Action is entirely automatic and continuous through two porous ceramic tubes—one inherently water-repellent, the other water-permeable but air-impervious.

The product already has found usefulness in connection with pneumatic tools, atmosphere gas generators, compressors, air-actuated control systems, vapor quench lines, spray and blast equipment, and other pneumatic apparatus in which moisture may corrode the equipment or damage the work.

Basis of the product is a new and recently discovered method for automatically separating liquid and gas phases by virtue of the surface tension of the liquid. Compressed air entering the Liqui-jector passes through the first (and water-repellent) tube where it is stripped of moisture. The action is by coalescence of droplets on the surface of this tube—a coarse ceramic material with an average of 50,000 pore openings per square inch, each so small that the pressure drop across the tube is insufficient to permit water passage against the resisting diaphragm-action of its surface tension. The coalesced moisture drops to the bottom of the unit where it passes through the second tube (without loss of air) to outside atmosphere. This second tube is constructed of micro-porous porcelain, with an average of 720 million pore openings per square inch, and (being constantly wet by its wick action) constitutes a perfect air seal up to the rated limit working pressure of the unit. This rated pressure may be manipulated to user specification.

The first-perfected and smallest unit, Model A-150-1, shown in the accompanying illustration, accommodates lines up to ⅜" pipe size with line pressures up to 100 psi. Other units are now being perfected to handle the greater demands of the larger lines.

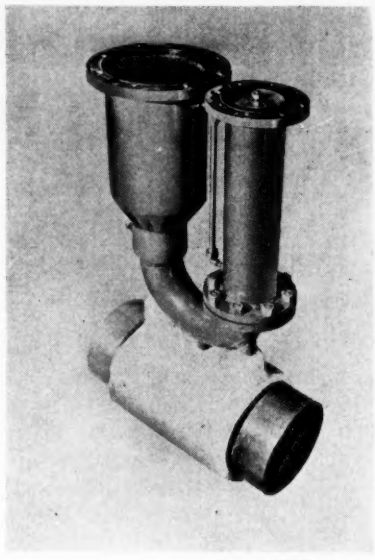
Gas Proportioner QC 430

This new piece of apparatus was developed in Air Reduction's Research Laboratories to meet the demands of electronic tube manufacturers, heat treaters and others who use mixtures of gases for protective atmospheres. It is designed to produce an accurately proportioned mixture of such gases at a pressure not in excess of 5 lbs. per square inch.

This new device consists of a mixing block incorporating accurately sized orifices and on which are mounted flowmeters, pressure gauges and needle valves for the gases as well as inlet and outlet nipples. It can be furnished with any two of six available flowmeters permitting a wide variation in the proportion of the two gases to be mixed. Flowmeter for hydrogen service cover a range from approximately 2 to 200 cubic feet per hour and for nitrogen the range is from approximately 6 to 140 cubic feet per hour. The gases should be supplied through two-stage regulators capable of delivering the required volume at pressures from 10 to 25 lbs.

High Vacuum Diffusion Pump QC 431

Developed by National Research Corporation, this type B-8-0 industrial high vacuum diffusion pump is claimed to have remarkable speed pumping characteristics especially when used in conjunction with the fast pumping National Research diffusion pump oil. Against a modest forepressure requirement of approximately 500 microns of mercury absolute, it will handle around 2,500 cubic feet of free air per minute in the pressure range of .1 to .01 microns.



Made entirely of metal and designed to withstand the rigors of industrial use, it has four stages of jets to give the high pumping speed and an 8-inch inlet flange for large gas-handling capacity.

It is equipped with an electric-heated boiler with automatic thermoswitch and has built in cut-off switches in case the water supply fails or the boiler overheats. Water cooling coils on the boiler give a short cooling down period and allow for a rapid exposure of the pump to atmospheric pressure after use.

Oil Sludge Pump QC 432

A new 300 GPM pumping unit, powered by a 25 HP diesel engine has recently been produced by the Blackmer Pump Co.

The new pump is designed for handling oil sludge and is fitted with steam jacketed heads to lower the viscosity of the pumpage. The engine speed is 1200 RPM, reducing through a double-reduction, oil-immersed drive to 300 RPM on the pump shaft. The discharge pressure of the pump is 25 psi.

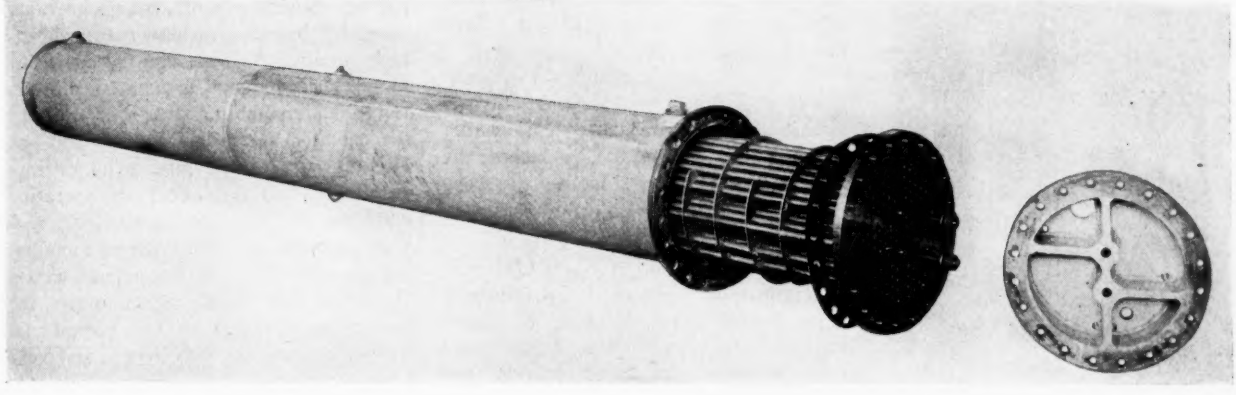
Currently these pumping units are being furnished to the U. S. Navy. Similar units, powered by diesel, conventional gasoline or steam engines, or electric motor have many industrial applications and will, according to the company be a part of the Blackmer post-war line.

Corrosion-Resistant Globe Valve QC 433

A "Karbate" globe-type corrosion resistant valve is now being manufactured by the National Carbon Company, Inc. Through addition of the valve to its list of products for the chemical and process industries, National Carbon has made it

Typifying
PATTERSON-KELLEY
Service and Products

Water Coolers for FREON *and* METHYL CHLORIDE *Constructed of Everdur*



There's a lot of tubing in this Cooler...with the Freon Section designed to insure the proper distribution of refrigerant and positive oil return, and the Water Section properly baffled to provide for the most efficient transfer of heat. This equipment is typical of products identified with the name Patterson-Kelley and of the company's engineering service.

And here is what is back of every Patterson-Kelley unit: careful engineering to assure efficient operation and economy of materials; second, experienced workmanship to assure a well-constructed durable unit. Years of service in the field of heat exchangers—*and coolers are heat exchangers*—place us in the class of cooler specialists.

EST. 1880

THE PATTERSON-KELLEY Company, Inc.

Main Office and Factory **112 WARREN STREET, EAST STROUDSBURG, PA.**

BOSTON 16, 96-A Huntington Avenue • NEW YORK 17, 101 Park Avenue • PHILADELPHIA 3, 1700 Walnut Street • CHICAGO 4, Railway Exchange Building

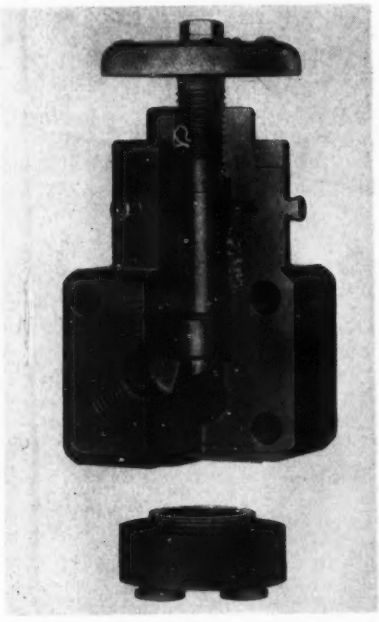
Representatives in All Principal Cities

8-PK-2

possible to install complete conveying and heat transfer systems constructed entirely of "Karbate" chemically inert materials.

The new globe-type valves, like "Karbate" tanks, heat exchangers, pipes, fittings, towers, and pumps, are resistant to practically all corrosive chemicals and are unaffected by extreme thermal shock.

The valves are available in 1" and 2" sizes. Tested to withstand 50 lbs. pressure, they are uniquely small and lightweight, with short face to face dimensions. "Karbate" valves are of graphite stock and are self-lubricating. The inert chemical properties of the material prevents corrosion-caused sticking of the moving parts, thereby cutting down the maintenance normally required to keep valves operating at full efficiency.

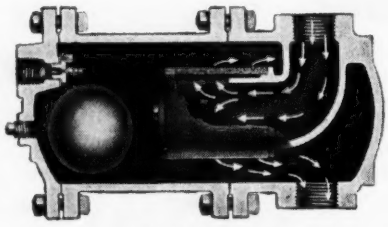


"Karbate" valves are equipped with adapter plugs for steam-heating those fluids that tend to crystallize or solidify when handled through unheated lines. Utilization of the adapter plugs for steam-heating the valve will prevent clogging and avoid shut-downs while valves are dismantled and cleaned.

Compressed Air Separator QC 434

A self-draining compressed air Separator, which eliminates the need for external traps or the uncertainties of manual draining, has been developed by the Johnson Corporation, of Three Rivers, Michigan. Known as the Johnson Type SA Separator, it has a complete trap mechanism built right in, which releases from the separator, automatically, all the water, oil and other moisture that has been removed from the compressed air.

The operation of the Type SA in removing water, dirt and oil from compressed air is identical with that of the standard Johnson Separators. It employs the two principles of (1) expansion and (2) change of direction, a combination which, according to the manufacturer, achieves an efficiency of more than 99%. The entering air is first allowed to expand slightly, thereby precipitating most of the entrained moisture. Then it passes through the "thousand baffles"—a labyrinth of coarse wire mesh—changing direction of flow abruptly many times, and surrendering the remaining particles of foreign matters.



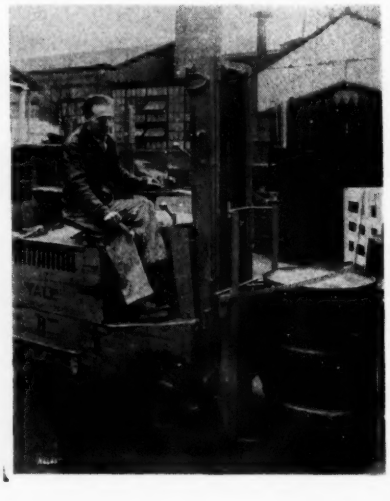
The trap mechanism is simple and compact, with spherical float and chrome steel valve and valve seat. It is mounted on the bottom plate of the Separator body, and can be quickly and easily removed for inspection or cleaning. All the moisture that has been removed from the compressed air drops to the bottom of the Separator, and when the level of the accumulated liquid is sufficient to raise the float, the valve opens and the liquid flows out the drain.

The separator is available with capacities of 80 or 160 cubic feet of free air per minute at 90 lbs. pressure. The smaller size has inlets of ¾, 1, or 1¼ inches; the larger inlets of 1½ or 2 inches.

Drum Handling Truck QC 435

Certain types of industries, particularly those involving the handling of chemicals, gas and oil, paint and similar materials in metal drums or barrels, are claimed to report unusual economy, speed and efficiency through the use of the Yale Telescopic Tilting Fork Truck equipped with a removable barrel handling device.

This ingenious addition has special short forks and a metal loop which is dropped over the barrel or drum by lever action after the forks have been slid underneath. The device enables the operator to pick up barrels and drums and transport them in and out of cars and storage without stepping off the truck. In effect, one man does the work of several, moving many containers in an hour's time with speed and safety. When job is completed, the barrel handler is removed, the regular forks are replaced and the truck resumes its routine materials handling functions—lifting and moving and high-stacking skid and pallet loads in and out of storage.



Spray Gun for Metals QC 436

Metallizing Engineering Co., Inc., announces the introduction of the METCO Type 3E metallizing gun for the high speed production spraying of low melting point metals. Using ⅛ inch zinc, tin, lead, solder, babbitt, cadmium, or fine gage copper and copper alloys, this new gun exhibits spraying speeds which are claimed to exceed by far any yet attained with these metals. Rates of deposition, in pounds per hour, includes zinc—40, tin—70, lead—110, solder—90, babbitt—75.

Regardless of the type of wire employed, no gear changes whatsoever are necessary to achieve these extraordinary high speeds. Any spraying speed within the prescribed ranges is automatically obtained, and maintained hour after hour, by the patented Controlled Power Unit—an integral part of the gun. Air pressure fluctuations do not affect its operating efficiency.

In common with other Metco metallizing guns, the Type 3E is equipped with a Universal Gas Head, which allows the tool to be operated on any commercial gas—in conjunction with oxygen and compressed air. A duplex mounting fixture is provided for permanent installation on the production set-up.

Typical applications for spraying low melting point metals on a production basis include: corrosion-resistant coatings on iron and steel structures and equipment; water- and chemical-resistant linings for storage tanks and degreasers; conductive and soldering surfaces on glass, plastics, and carbon products.

High Pressure Rotary Pump QC 437

A new pumping unit capable of discharge pressures of 500 psi. has been designed and put into production by the Blackmer Pump Company. These new pumps are built in all iron and bronze fitted constructions. Rated capacities 50 and 90 GPM for discharge pressures to 500 psi. Standard motors with separate gear reduction or gearhead motors may be used. Units are also available for engine drive. While current production is entirely on the 50 and 90 GPM sizes, it is planned that larger capacities will be available later.

★ ★ ★ ★ ★

POWELL VALVES

by prescription

★

"Doctor-book" treatment is of dangerously doubtful value when an undiagnosed condition exists, or is suspected to exist! The experienced collaboration of physician and pharmacist is not only indicated but required.

Specific conditions to be met in the installation and functioning of valves likewise demand scientific specialization . . . the working-together, understandably, of engineering and manufacturing experience to produce the valve to meet these conditions.

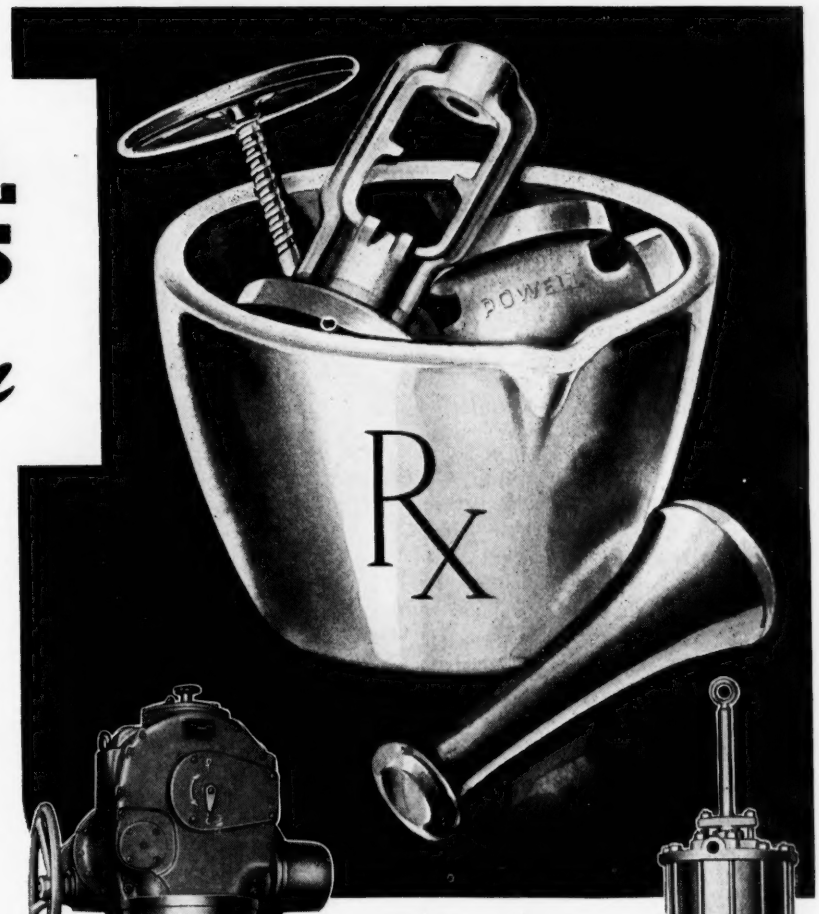
The successful experience of nearly a century of POWELL Engineering and manufacture of valves—and valves only—is at your service . . . in consultation, in prescription, in supply. This clinical know-how, gained in hundreds of thousands of "cases" is the professional asset we share with every POWELL Valve buyer.

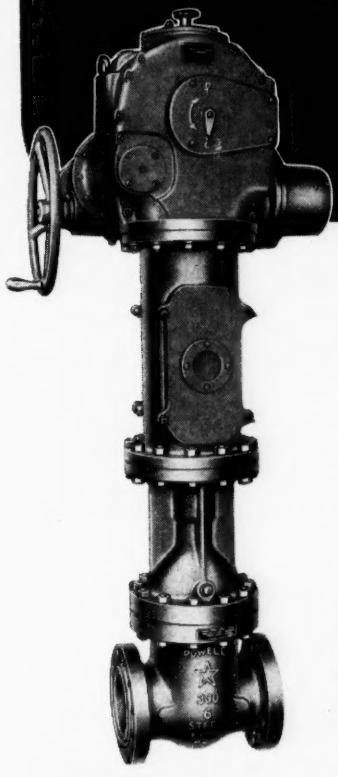
The valves illustrated are but a few of the Powell Valves for Corrosion Resistance. The complete line includes every type of valve made in various pure metals, special alloys, iron and steel, to handle satisfactorily every corrosive media. Write for the details and copy of new booklet—"Powell Valves for Corrosion Resistance."

The Wm. Powell Co.

Dependable Valves Since 1846

Cincinnati 22, Ohio





Class 300-Pound, 6 inch, Stainless Steel, Flanged End Gate Valve, equipped with top-mounted, electric motor operator for unusually fast opening and closing. Especially adapted for refinery service.

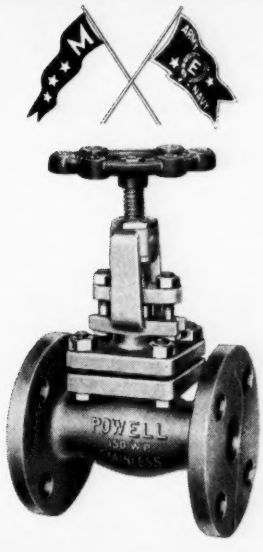
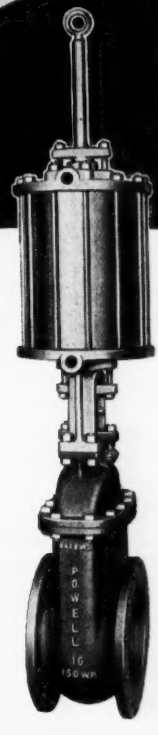


Fig. 1979—Stainless Steel Globe Valve for 150-Pounds W. P. Has flanged ends, outside screw rising stem threaded through bronze yoke bushing, bolted bonnet and plug type disc. Sizes, ¼" to 3", inclusive.



Class 150-Pound, 10 inch, Stainless Steel, Flanged End Gate Valve, equipped with cylinder for automatic, remotely controlled opening and closing. Cylinder may be actuated by water, air, steam or oil.

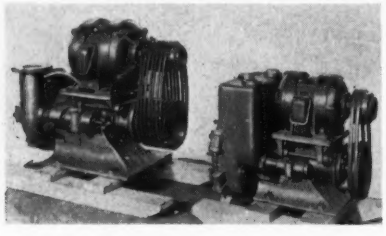
POWELL VALVES

This is the first standard pump for pressure greater than 300 psi. to be added to the Blackmer line, and is the result of extensive development work which has been carried on over the past two years. Several of the new units have been furnished for pumping oils of various types, and they are designed for handling similar liquids having lubricating properties.

The new pumps employ the "bucket design" (swinging vane) principle, the same as used in practically all of the standard Blackmer pumps. The casing and working parts are, of course, heavier to withstand the higher pressure.

Centrifugal Pump QC 438

Previously available with motor directly coupled to the impeller shaft or with "V" belt pulley, flat pulley or sprocket on the shaft, Amsco-Nagle Centrifugal Pumps of the horizontal type are now available with the motor mounted overhead as shown.



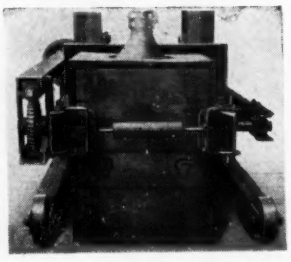
This new arrangement offers the following advantages, according to the engineers responsible for its design. Pump can be operated at more accurate speeds. Speed changes can be provided where the duty calls for such changes. Motor is stationed at a more accessible point and is at the same time protected against flooding. Too, this arrangement requires less floor space for installation.

The manufacturer's Type "A" and Type "T" pumps, both horizontal, are available with this motor mounting. A 5" Type "T" pump and a 2" Type "A" (at right) are shown.

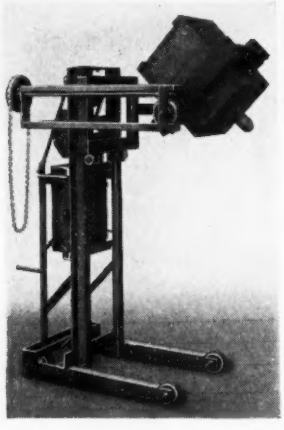
Carboy Dispenser QC 439

Pouring acids from a carboy by hand is an arduous and hazardous procedure. Furthermore, it is often impossible to raise the container high enough to empty into a vat or tank.

The Revolvator special carboy dispenser illustrated here is said to make the job easy and safe.



The top view shows how the Revolvator is wheeled into position straddling the carboy on the ground. Turning the roller in front of carboy tightens the clamps through heavy screws until the carboy is securely held. Turning the crank seen in the lower picture quickly elevates the carboy to the desired height. It is then tilted

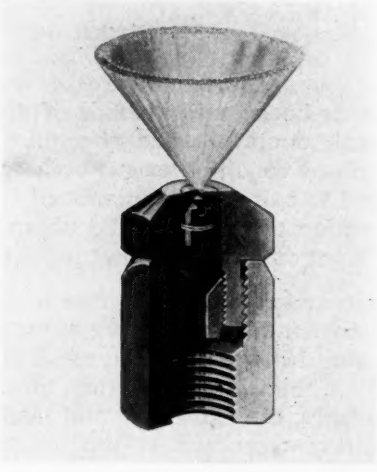


slowly by rotating the chain at left driving through worm mechanism. The carboy is held in any desired position until moved again by the chain. After emptying, the carboy is returned to an upright position and gently lowered by the standard Revolvator dead man brake lever which is the same handle as is used for elevating.

Spray Nozzle QC 440

For chemical processes involving the spraying of acids or other corrosive liquids, there are now available atomizing nozzles made entirely of hard rubber.

These nozzles produce a hollow cone type of spray effecting uniform distribution of the liquid being sprayed. A variety of sizes provides a practical range of capacities and spray angles which permit exercising of close control over the spraying operation.



For each of these capacities, liquid atomization will be the finest possible at available pressures and is the most complete that can be secured using relatively low hydraulic pressure alone.

Nozzles are of core type, accurately machined and carefully finished. Overall dimensions are a 1" diameter and length of 1½".

Motor Starter QC 441

A new magnetic, reduced voltage cage motor starter, which protects motors from sustained overloads, locked rotor condition, single-phasing and overloading from too frequent starting, has been announced by the Allis-Chalmers Mfg. Co. This is accomplished in the new starter—called type "ARC"—with an accurately calibrated, thermal overload relay. Built for general industrial applications, the new starter is now available for control of motors from 5 to 2,500 horsepower, up to 5,000 volts, 3-phase, 50 or 60 cycles.

Reduced voltage, two-point starting is obtained with a built-in auto-transformer, utilizing accurate, synchronous motor-driven, adjustable timing relay for transition from starting to running position. (Units rated through 800 hp have built-in auto-transformers; above 800 hp, auto-transformers are furnished for separate mounting.) Interrupting capacity rating of the new starter is ten times the motor's full load current.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (7-4)

Please send me more detailed information on the following new equipment.

QC 429	QC 432	QC 435	QC 438	QC 441
QC 430	QC 433	QC 436	QC 439	
QC 431	QC 434	QC 437	QC 440	

Name ..... (Position) .....

Company .....

Street .....

City & State .....

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NOOTER-FABRICATED

HASTELLOY

• • • A new nick[illegible]base alloy of high strength recently developed for [illegible]usual corrosion resistance.

It is desi[illegible]d to withstand ferric chloride, hydrochloric acid, wet chlorine and other mineral acids, over a wide range of temperatures, concentrations and pressures.

Hastelloy is the economical solution to many corrosion problems; applied in isomerization reactors, fabricated piping, condensers, agitators, chlorinating equipment for the refining, chemical and processing industries.

The fabrication of Hastelloy alloys requires great skill. As pioneers in this difficult type of work, we offer you our knowledge and experience.

Our engineering department will be glad to work out your fabrication problems with you.

JOHN NOOTER BOILER WORKS CO.

Alloy and Bi-Metal Fabricators

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ARMY NAVY

NOOTER ST. LOUIS

PACKAGING & SHIPPING

by T. PAT CALLAHAN

Interstate Commerce Commission Rules For Shipping Inflammable Liquids

An inflammable liquid under the Rules and Regulations of the Interstate Commerce Commission for Transportation is any liquid which gives off inflammable vapors (as determined by flash point from Tagliabue's open-cup tester, as used for test of burning oils) at or below a temperature of 80° F.

T. Pat Callahan

The greater percentage of inflammable liquids are shipped in steel drums and tank cars and we give you excerpts of the Interstate Commerce Commission Regulations pertaining to the packing and outages required in the shipment of inflammable liquids.

Section 101 (b) to (j) of the ICC Rules and Regulations covers in detail the amount of outage which is required in the shipment of inflammable liquids in tank cars and drums and quoting from these Regulations:

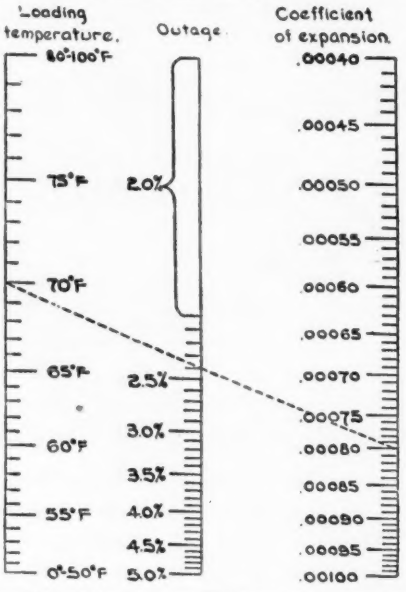
"The proper vacant space (outage) in a tank car or other shipping container depends on the coefficient of expansion of the liquid and the maximum increase of temperature to which it will be subjected in transit. Outage must be calculated to the total capacity of the container."

All persons who make shipment of inflammable liquids should acquaint themselves with the provision of the Regulations for the loading as covered in Section 101 (a) to 101 (j) as well as the other provisions of the Regulations pertaining to the specification containers authorized.

Section 101 (i) of the Regulations includes an outage chart for inflammable liquids together with an example and a summary of the coefficient of expansion per degree Fahrenheit of the principle inflammable liquids, which must be used in determining outages. We are printing Section (i) because if this chart is used in determining outages, it is felt safety in the transportation in the shipment of inflammable liquids will ensue.

(i) OUTAGE CHART FOR INFLAMMABLE LIQUIDS:

Example: Suppose the temperature of the liquid at time of loading is 70° F. and its coefficient of expansion is 0.00080; lay a ruler on the chart running from 70° F. to 0.00080 as shown by the dotted line and the required outage is 2.4 per cent where the ruler crosses the outage scale.



The following coefficients of expansion per degree Fahrenheit, of the principal inflammable liquids shall be used in determining outages:

Aceton	0.00085
Amyl acetate	.00068
Benzol (benzene)	.00071
Carbon bisulfide	.00070
Ether	.00098
Ethyl acetate	.00079
Ethyl (grain) alcohol	.00062
Methyl (wood) alcohol	.00072
Toluol (toluene)	.00063
Gasoline or naphtha:	
50-55° A. P. I.[1]	.00055
55.1-60° A. P. I.[1]	.00060
60.1-65° A. P. I.[1]	.00065
65.1-70° A. P. I.[1]	.00070
70.1-75° A. P. I.[1]	.00075
75.1-80° A. P. I.[1]	.00080
80.1-85° A. P. I.[1]	.00085
85.1-90° A. P. I.[1]	.00090

[1] °A. P. I. (American Petroleum Institute), according to the following formula:

$$°\text{A.P.I.} = \frac{141.5}{\text{Specific Gravity}} - 131.5$$

The largest percentage of damage in transportation is caused by inflammable materials and in order to reduce to a minimum losses caused by inflammable liquids, the Bureau of Explosives has spent a great amount of time and effort to acquaint shippers involved in the shipping of inflammable material.

From the above, it will be noted that particular attention must be paid to outages in the packing of inflammable liquids in all forms of containers prescribed by the Interstate Commerce Commission.

Tank Car Shortage

The director of the Office of Defense Transportation has written a letter to all railroads asking that quicker turn around on tank cars be investigated. This is caused by a very urgent need for tank cars to meet the needs of the Armed Forces for petroleum and its products. All persons having anything to do with the movement of tank cars are requested by the director of the ODT to impress upon all employees the necessity for prompt handling of the tank cars both in the loaded and empty movements.

Order L-197 Clarified

Limitation Order L-197 which was amended on May 27, 1944, was perhaps the most difficult order issued by the War Production Board in that practically all users of steel drums were confused as to its content and applicability. However, the purpose behind this order has been explained by the War Production Board and every effort is being made by them to alleviate any discomforts caused by this order and at the same time protect the growing shortage of steel used in containers.

It is suggested that if quotas in the chemical industry do not meet the requirements of the manufacturer, that immediate appeal may be made to the Containers Branch of the War Production Board where attention will be given to such appeal.

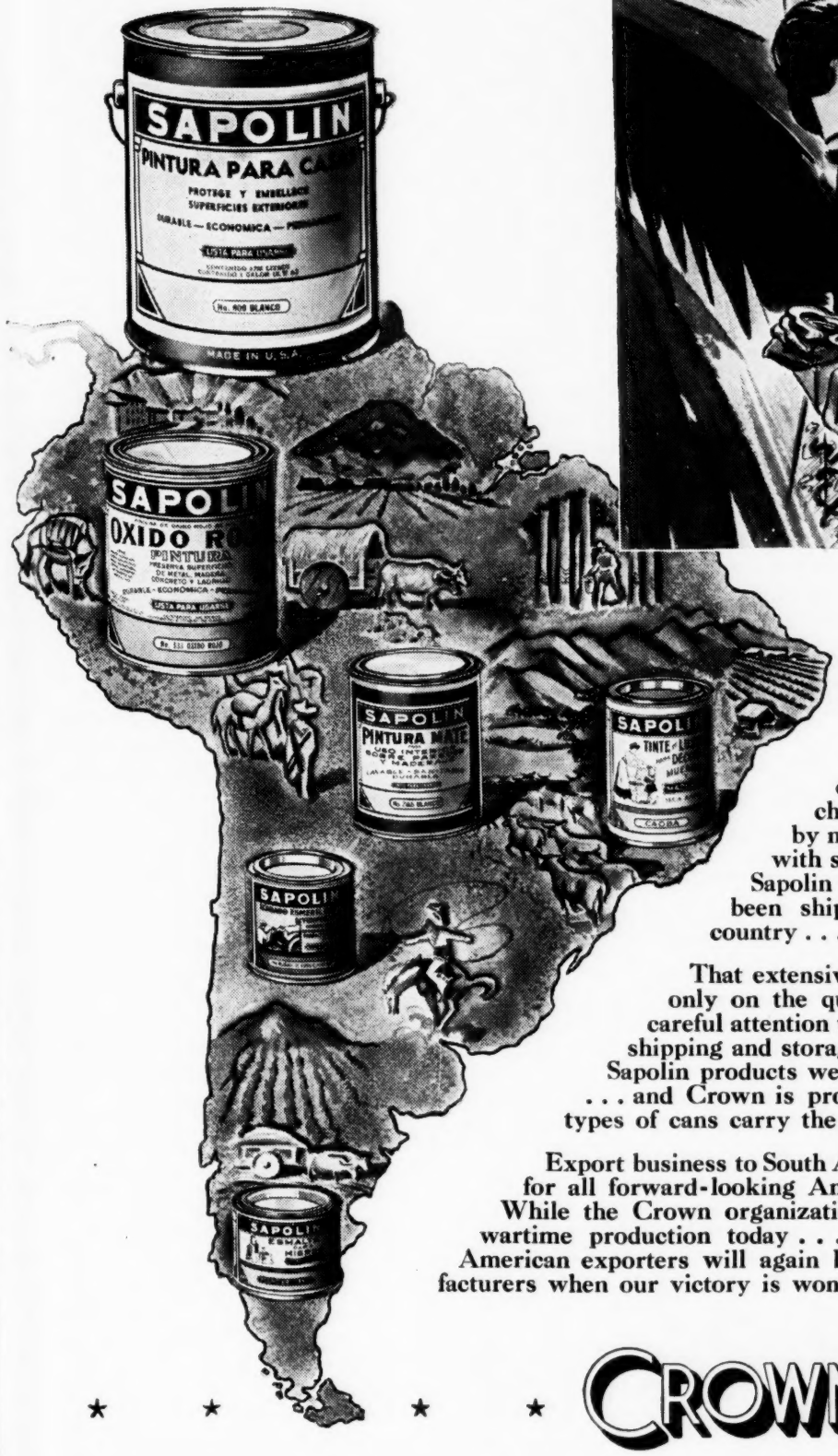
All shippers of products in steel drums will do well to continue to check very thoroughly the reuse of these containers as has been proven before. A careful check towards the reuse of drums will enable shippers to continue to move their products. With impending steel shortages for container steel, the reuse wherever possible will certainly pay dividends.

Fibre Drums and Pails Under Simplified Control

Order L-337 was amended on July 1, and we quote the announcement of this change by the War Production Board:

"Fibre shipping drums and pails have been placed under simplified controls with the revocation of Fibre Drum Conservation Order M-313 and the issuance of Fibre Drum Limitation Order L-337, the War Production Board said today.

Good Neighbor for 60 Years!



"Sapolin" is one of the best-known of all American trade-marks in South America . . . quoted on the commodity exchanges . . . specifically mentioned by name in recent Trade Agreements with several countries. For sixty years Sapolin Paints, Stains and Varnishes have been shipped to every Latin-American country . . . except the Argentine.

That extensive export business was built not only on the quality of the product . . . but by careful attention to the special problems created by shipping and storage conditions. The containers for Sapolin products were selected with the utmost care . . . and Crown is proud that its Doubletite and other types of cans carry the Sapolin trade-mark.

Export business to South America will undoubtedly increase for all forward-looking American firms once peace comes. While the Crown organization is concentrating on essential wartime production today . . . the experience gained serving American exporters will again be at the command of all manufacturers when our victory is won!

★ ★ ★ ★ CROWN CAN ★

CROWN CAN COMPANY • NEW YORK • PHILADELPHIA • Division of Crown Cork and Seal Company, Baltimore, Md.

"Substantially the same controls that existed under M-313 continue, but paper work is greatly reduced as fibre drum delivery will no longer be specifically authorized by WPB.

"The new Fibre Drum Order, L-337, established two schedules that list all products approved for shipment in new fibre drums. No letter of application to WPB is required for any listed product.

"Schedule A includes several classifications—chemicals, foods, petroleum products and some miscellaneous items, such as clay and soap. In all, more than 100 products and groups of products are authorized by this schedule for shipment in new fibre drums. Schedule B authorizes the use of fibre drums, under quota limitations ranging from 100 per cent of 1943, for paints and their ingredients and for lubricating greases. All products authorized by the schedules of L-337 were commonly shipped in new fibre drums under the revoked M-313.

"No packer is permitted more than a sixty-day inventory of fibre drums."

I. C. C. Container For Methyl Bromide

On July 7 the Interstate Commerce Commission amended the Regulations for the Transportation of Dangerous Articles by the addition of the following container for the shipment of Methyl Bromide.

"Spec. 5A—Metal drums not exceeding 30 gallons capacity or metal drums of bilge type not exceeding 33 gallons capacity. Use of these containers will be permitted because of the present emergency and until further order of the Commission."

The purpose of the amendment is to eliminate the provision that 13 gauge metal be used in the construction of bilge-type barrels as was necessary prior to this change.

Reuse of Fibre And Paper Containers

For several months we have stressed the serious shortage of paper for packaging. This shortage is now becoming more and more critical so that it becomes increasingly necessary to either reuse certain paper and fibre containers or suffer the consequences of not getting packages.

It is definitely stated by the Containers Section of the War Production Board that the fibre and paper shortage so far as its use in containers is concerned, is more critical than in any period and will become more critical.

Regardless of what the circumstances, if it is possible to reuse any container constructed of fibreboard or any form of paper, such should be done. Many firms who thought it impossible to reuse containers have now been forced to adopt a reuse program and we definitely feel that those who do not do so will find themselves without containers in which to ship their goods.

Glass Container Restrictions Eased

The use of glass containers for the packing of most foods, drugs and health supplies (formerly under quota) in most instances is now unlimited, the War Production Board said today.

Closures for glass containers, while still under some restrictions when made of prime blackplate or tinplate, are expected to be available for the increased quantity of jars and bottles. Aluminum and blackplate rejects are now quota-free when used for glass container closures, whatever the product. To obtain aluminum, the manufacturer files only a CMP-4 form, the standard application for aluminum.

Last March, aluminum was authorized on a quota basis for closures to pack products for which aluminum was used for that purpose in 1939, 1940 or 1941. Under the new ruling, aluminum is available, without regard to quota, to make closures for any glass-packed product.

Liberalization of glass container use was effected through an amendment to Glass Container and Closure Quota Order L-103-b.

Increased production, resulting from the wartime standardization of glass container types, has made it possible to permit the use of more jars and bottles, WPB said. In 1943, approximately 93,000,000 gross of glass containers were manufactured. Production this year is expected to exceed 1943 by some 13,000,000 gross. Standardization of types will continue.

Schedule I (Foods) of Order L-103-b has been rewritten to permit the unlimited use of glass containers for most foods for human consumption. In the past, many foods have been permitted no more than 100 per cent of 1943 glass container use. Under the new schedule, only the following types of food product previously denied wartime containers, are restricted in the use of glass containers to 100 per cent of their use of glass in a base period: spaghetti and macaroni items, candy and nut meats, corned beef hash, and sauerkraut.

Schedule II (Drugs and Health Supplies) of Order L-103-b, now grants unlimited use of glass containers for such products as tooth powder, oral antiseptics, ointments, laxatives and related items. Most of these products were previously limited to 100 per cent of 1943 use of glass containers and closures.

Chemicals, Cosmetics and Toiletries, as listed in Schedules III and IV, retain their previous packing quotas, usually 100 per cent of last year, but are permitted the unlimited use of aluminum and blackplate rejects for closures.

An important change in the order increases the small users' quota from $500 worth of glass and an equal number of closures to seal this glass to $2,500 worth of glass and caps combined. Of this $2,500, not more than $1,000 may be used for the purchase of closures. This provision will enable many small packers and bottlers throughout the country to operate more freely than under strict limitations formerly placed on them.

Manufacture and Use of New Paper Shipping Sacks Restricted

To assure an adequate supply of paper shipping sacks for packaging and for shipping certain essential products and materials, restrictions governing the manufacture and use of new sacks have been promulgated by the Paper Division of the War Production Board through amendments to Limitation Order L-279.

Starting with the allocation of kraft pulp, manufacturers of paper intended for making shipping sack paper and producers of paper sacks from kraft pulp are required to use such pulp for no other purpose, Burton A. Ford, Chief of the Paper Shipping Sack Section of the Paper Division, said.

Amendments to the order also restrict the use of this type of paper for purposes other than those listed in Appendix A. That list includes many agricultural and chemical products and pigments; minerals and building materials, as well as various essential miscellaneous items, all of which are packaged for storage and shipment in paper shipping sacks.

Commercial consumers who used sacks made of shipping-sack paper prior to issuance date of the amended order (August 8), may continue to use them for such purpose for 45 days.

Other restrictions cover asphalted paper (asphalt laminated, impregnated, coated or infused with asphalt or asphalted compounds), paraffined and moisture-proof paper when used in paper shipping sacks. These materials are used to protect chemically reactive and hygroscopic (moisture-absorbing) materials.

The allowable items listed in Schedule B include a number of minerals, chemicals, foods and seeds, as well as insecticides, fungicides, disinfectants, germicides, asphalt and certain hygroscopic types of cements.

Exceptions in the use of sacks containing these moisture-proof sheets are made when shipments are intended for the Armed Services or foreign export, and for use by the Foreign Economic Administration when shipped empty to the armed forces, it was stated.

Atlantic Cargo Rates, Surcharges Revised

The War Shipping Department announced a revision of rates and a lowering of surcharges on tankcar shipments of bulk cargoes in the Atlantic waters, reflecting the improved shipping conditions, August 2. In most cases the rate and surcharge changes applied to movements of petroleum to and from South American and West Indies Ports.

DU PONT PRODUCTS YOU SHOULD INVESTIGATE

These emulsions are effective adhesives for paper and other cellulose products, cloth, leather, [illegible] and ceramics. Can be used as binders for paper pulp, sawdust, leather, sand, clay, and other organic and inorganic molding or coating masses. Suitable as wet-bond or heat-sealing adhesives. Today they serve as superior replacements for rubber latex and other essential materials, particularly in the adhesives field. Colorless, durable films, useful as heat-sealing tapes, can be made by evaporation of water.

CHARACTERISTICS
POLYVINYL ACETATE EMULSIONS

Form	Free flowing, milky white liquids
Total Solids	55% minimum
pH	4–6
Color	Milk white
Unpolymerized Vinyl Acetate	Less than 2%
Weight per gallon	Approx. 9 lbs.

FILMS AND COATINGS

Physical Properties	
Form	Tough, resinous solid
Color	Water-white to cloudy
Density	1.19 at 20° C.
Specific volume	23.2 cu. in./lb.
Heat Sealing Temperatures	
RH-460A	125° C. (approx.)
RH-460	100° C. (approx.)
Note: Plasticizers may be used to modify these temperatures.	
Chemical Properties	
Stability to light	Excellent
Burning rate	Slow
Effect of reagents	Hydrolyzed by strong acid or alkali

PROPERTIES

Polyvinyl Acetate Emulsions are available in two grades. Both have the same resin content and viscosity but differ in the softening point (heat sealing temp.) of the contained resin.

The emulsion obviates use of organic solvents and special equipment. It can be diluted as desired by adding water; readily accepts plasticizers, pigments, and other materials commonly used in adhesive, binder and coating formulations.

COMPATIBILITY—Solutions of starch, dextrins, glue, casein and emulsions of asphalt, paraffin wax, rubber, natural and synthetic resins may be added to these Polyvinyl Acetate Emulsions.

Polyvinyl Acetate Emulsions have other properties of interest to paper makers and converters, and to manufacturers of textile sizes, water paints, leather finishes and dressings, and other aqueous preparations requiring an adhesive constituent or binder.

USES AND APPLICATIONS

ADHESIVES—Polyvinyl Acetate Emulsions are used commercially as adhesives for joining textiles, paper, cork, leather, metal, wood, ceramics, etc. Use of heat is not always necessary, but in many instances application of heat during or after drying will increase bond strength. Plasticizers may be used to modify both the tack or initial "grip" of wet or partially dried emulsion coatings. Sealing temperatures and flexibility of the bonding films can also be modified by plasticizers.

Mixtures of Polyvinyl Acetate Emulsions and starch solutions are superior to starch alone in water resistance and strength of final bond.

Adhesives for use in fabricating shoes and other leather products and in food packaging are prepared by simply adding to the diluted emulsions the amount and type of plasticizer necessary to give desired tack and flexibility. In some cases emulsions of other resins or rubber latex are added to meet special requirements.

BINDERS—Paper pulp, wood flour, shredded asbestos, ground cork, textile fibers, sisal fiber, hemp and similar materials may be mixed with diluted emulsion and the resulting plastic mass subjected to heat and pressure to produce sheets, containers, casting molds and cores, reproducing impressions, models, etc., of remarkable strength and durability.

FILMS AND COATINGS—Adherent films of Polyvinyl Acetate may be deposited on wood, cloth, paper, metals, ceramic ware, etc., by coating with emulsion, followed by water evaporation. They are stable to light, oxidation and aging; unaffected by aliphatic hydrocarbons, vegetable oils or animal fats.

★ ★ ★

These emulsions offer a means of extending the established usefulness of Polyvinyl Acetate. Limited quantities are available for research and experimentation. Further details may be obtained from: Electrochemicals Department, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

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PLANT OPERATIONS NOTEBOOK

by W. F. SCHAPHORST

Weight Chart for Steel Rods and Discs

Here is a chart that will be appreciated by all readers who have to do with steel rods—or even discs. It gives the weight of any steel rod in ordinary use, whether solid or hollow, and any disc up to 10 inches in diameter.

For example, what is the weight of a steel rod 1.5" in diameter and 1000 ft. long?

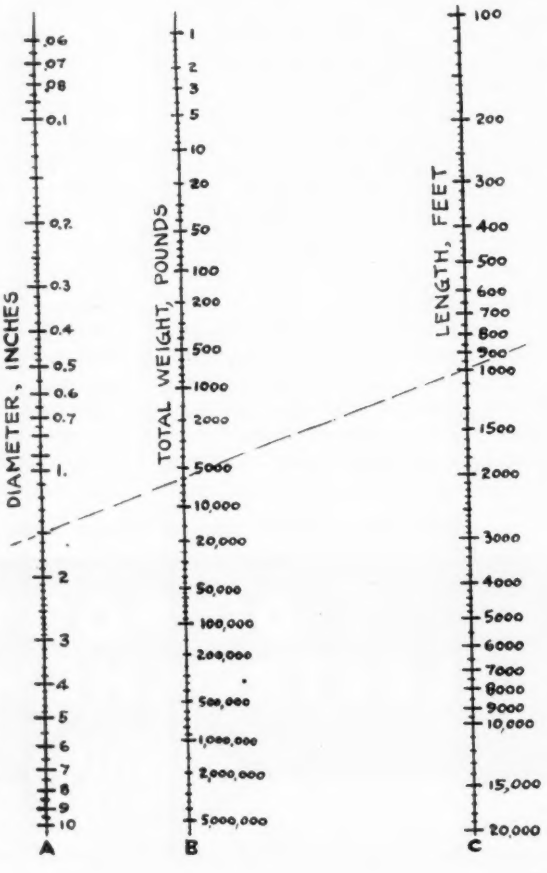
Answer: Run a straight line through the 1.5 in column A and the 1000 in column C and column B immediately tells us that the weight of the rod is 6000 pounds.

As will be noted the range of the chart for this sort of computation is very wide —from diameters of 0.06" to 10 inches; and lengths from 100 ft. to 20,000 ft.

The chart is easily applicable to ANY length by simply shifting the decimal point. Thus since the above 1000 ft. of rod will weigh 6000 pounds it is obvious that one foot will weigh 6 pounds. Simply shift the decimal point three places to the left. Or, a piece only 0.1 ft. long will weigh 0.6 lb. Or, 0.01 ft. long, 0.06 lb.; 0.001 ft. long, 0.006 lb. The latter, of course, would be known as "discs" rather than rods.

Again, let us suppose that the above rod 1000 ft. long is hollow—that the inside diameter is 0.5 inch. What is the weight of the hollow rod? In that event find the weight of a 0.5" rod 1000 ft. long and subtract that weight from 6000 pounds.

The chart tells us that the 0.5" rod to be deducted would weigh 700 pounds. Subtracting 700 from 6000 we find that the hollow rod whose length is 1000 ft. and inside and outside diameters 0.5" and 1.5" respectively would weigh 5300 pounds. One foot of that rod would weigh 5.3 pounds. One-tenth of a foot would weigh 0.53 pound. A ring 0.001 ft. thick would weigh .0053 lb. And so on.



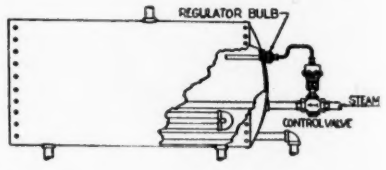
Simple Test For Oil in Boiler Water

Here is a valuable kink that was given to me the other day by a former chief chemist whose specialty was boiler waters and boiler water treatment. I am sure many others will be glad to know about it.

My chemist friend informed me that there is a really good and surprisingly simple test for oil in boiler water. Just take an ordinary clean test tube, fill it to a depth of about two inches with the feed water you want to test and shake it in your hand with your thumb over the opening for a few minutes. If at the end of a sufficient period there is an accumulation of bubbles on the surface of the water you can be almost positive that there is oil and plenty of it in the water. The test is really quite sensitive, and one which any boiler operator can perform with amazingly accurate results. If at the end of the shaking period there is no evidence of bubbles at all, you can be pretty sure that the amount of oil in the water is too little to cause any harm.

Maintaining High Water Tank Temperature

The simplest way in which to control steam lines up to 2½" diameter for maintaining high temperature in a tank of water is shown in the accompanying sketch. Place the regulator bulb in the tank, as indicated, and the control valve



directly in the steam line. The vapor pressure in the regulator bulb causes the control valve to open and close with variation in temperature. In this way any temperature from 70 to 300 deg. F. can be maintained in either open or closed tanks or heaters.

Heavy Lifting Is Unsafe and Uneconomical

Regardless of how strong and agile you are, could you lift 100 pounds to a height of 1000 feet for one cent?

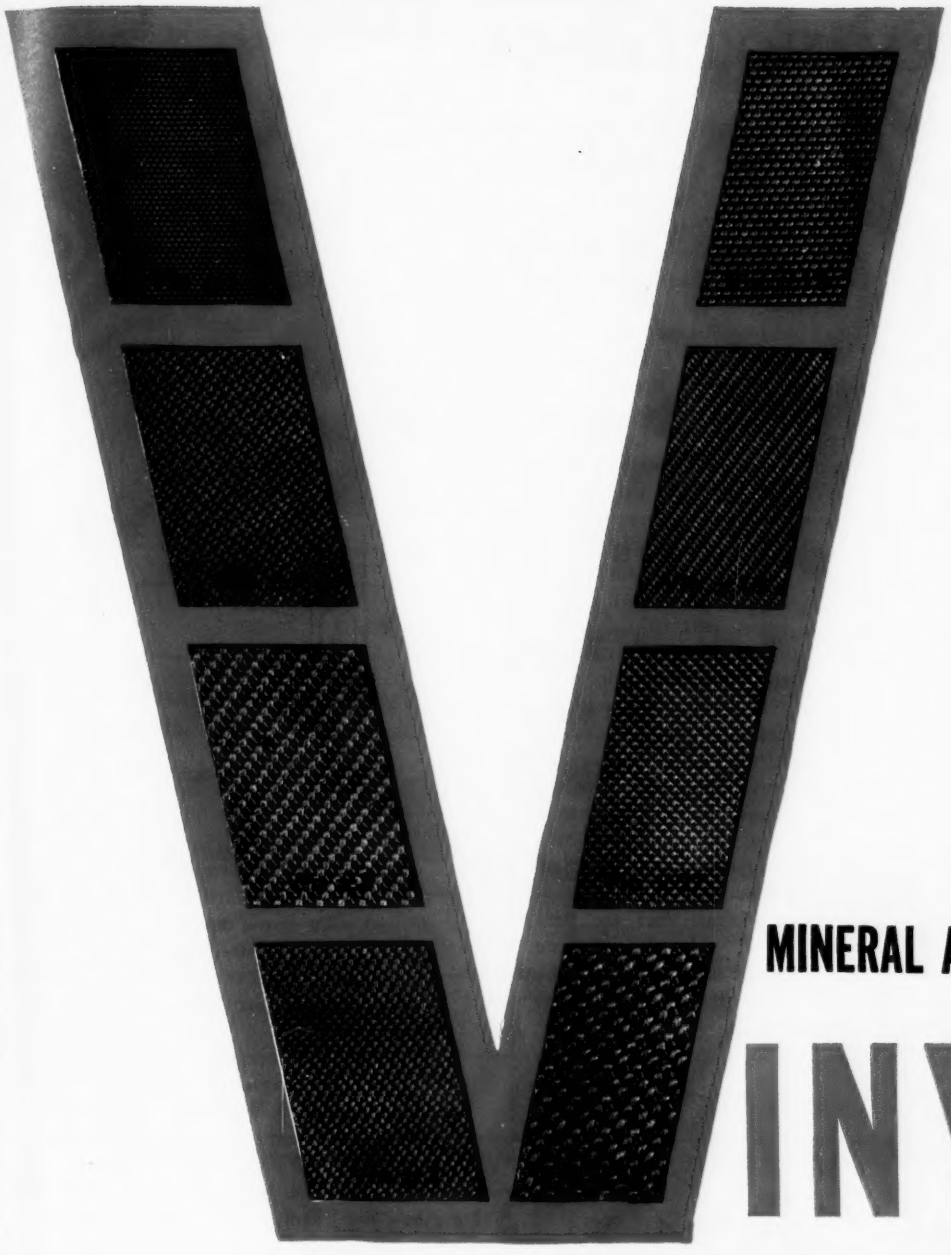
The answer, of course, is "No." But it is a fact that such lifting can be done by machinery and *is* done right along. One prominent manufacturer of hoists, for example, makes the unqualified statement that with its hoists, the cost of lifting is even less than 1/1000 of a cent per foot of lift per 100 pounds. The manufacturer adds this:

"A saving of only 30 seconds in a lifting or lowering operation will amount to a saving of 30 minutes' time per day, per sixty operations. Because of the low first cost of our hoists very few working days are required to return in full the investment."

Heavy lifting is unsafe. Don't do it and don't let your workmen do it.

So-called "hard work" is not as physically beneficial as is commonly supposed. A prize fighter is not allowed by his sensible trainer to exert himself to his limit in fitting himself for the supreme test. Too much work will make him stale for the same reason that all work and no play makes Jack a dull boy. So, in and around your plant, or anywhere else for that matter, the proper thing to do is to let machinery do your heavy lifting.

What is meant by "heavy lifting"? This writer's definition is this: Heavy lifting is any kind of lifting that cannot be performed easily. Thus for a child, 10 pounds might be heavy lifting. For some women, 10 pounds might also be heavy lifting. At the end of an arduous day 10 pounds might amount to heavy lifting for a tired strong man.



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Subject always to certain heat limitations, Vinyon has the advantage of being a synthetic product highly resistant to the strong mineral acids and alkalis used in many filtration processes.

Our engineers will be glad to discuss the possible application of Vinyon fabrics to your own particular industry. Why not check the following list, and if you have a filter fabric problem for one of these, write us your problem and include any information regarding your particular filtration process. We shall be glad to make suggestions and help you in any way possible.

- Pigments and Dry Colors
- Dyes and Intermediates
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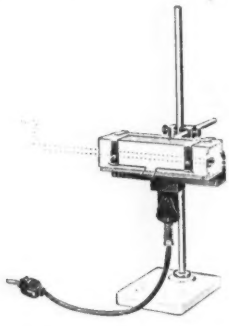
BUY MORE WAR BONDS

LABORATORY NOTEBOOK

Micro Combustion Furnace

The micro combustion electric furnace, von Czoernig-Alber, of the A. H. Thomas Co. for temperatures up to 750°C is used for elementary quantitative organic microanalysis, including determinations for carbon and hydrogen, method, halogens and sulfur by the catalytic procedure and metals or residues by the methods of Pregl, Alber and Coombs, and Meyer and Hoehne.



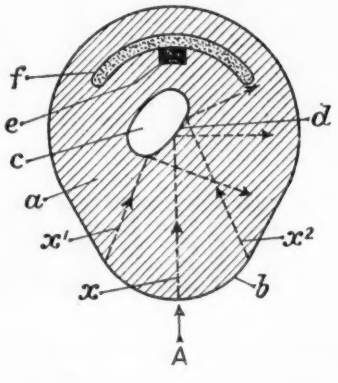
This furnace provides uniform and constant temperatures within the ranges required for many types of micro tests simply by changing the position of the tube in the furnace, but the use of a transformer or rheostat is suggested for critical work or when the temperature must be changed gradually without disturbing the tube. Dimensions of the chamber are 8 inches long x .1 1/16 inches deep x ½-inch high. The hinged front is of transite with a handle of stainless steel wire which can be raised with unprotected fingers. When operated without resistance and with the tube placed against rear wall of the chamber, temperature remains constant between 700°C and 730°C under normal voltage conditions. By moving the furnace so that the tube is in middle of the chamber, temperatures from 670°C and 700°C are obtainable. The lowest uniform temperatures are directly back of the hinged front where they are constant from 580°C to 600°C. Constant temperatures can be attained in approximately 30 minutes without use of a resistance. Average life of the heating element is approximately 2000 hours. Maximum power consumption, 3 amperes.

New Mercury-less Thermometer

Mercury-less thermometers usually employ liquids colored red, blue or green to ensure ready visibility under adverse lighting conditions. The colored liquids have the disadvantage that the color may bleach after long use or the dye may become encrusted upon the walls of the capillary. This is most likely to happen at low and high temperatures.

A new thermometer has been developed which does not have these drawbacks, as described by Schad, *Cremische-Zeitung,* Sept., 1940. It employs an organic liquid, which derives its color not from a dissolved dyestuff but from a colored stripe behind the capillary bore.

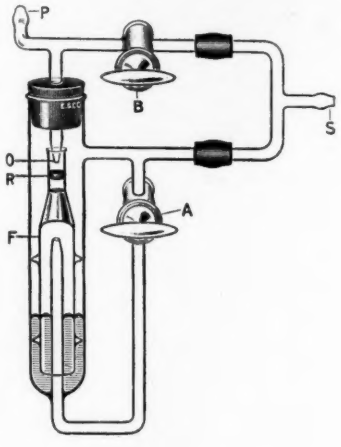
The function of the thermometer depends upon a novel capillary, a cross-section of which is shown in the diagram. The bore *c,* of elliptical shape, is disposed at an angle in front of a colored stripe *e.* Behind this is an opaque white or yellow-colored shield *f.* The front of the capillary is formed into a cylindrical lens *b.* In the upper part of the thermometer, where the bore is free from liquid, the front surface *d* totally reflects light incident from the side. The capillary appears silvery and covers the colored stripe like an opaque mirror, *i.e.,* the upper part of the thermometer appears colorless. In the lower part, this does not happen. The liquid has a refractive index which does not differ appreciably from that of the glass, and no reflection occurs. An observer at *A* can thus see the colored stripe, which, under the influence of the lens-shaped front, appears very broad. In other words the temperature-indicating thread appears colored.



The thermometer possesses the following advantages: The filling is chemically neutral and if the instrument should be broken there is no danger of damage to aluminum or other metal vessels. The non-poisonous nature of the liquid makes the thermometer particularly suitable for use in breweries, dairies and food preparation industries. The chemist and physicist will appreciate the fact that it has a temperature range of —200 to +400°C. Aged liquids are available to enable this very wide range to be covered. The shape of the bore has been chosen so that breaking of the thread is unlikely. Should this happen, however, through a knock, etc., the thread will run together spontaneously if allowed to stand for a while.

Manostat

A manostat, Cartesian, is recommended as a most convenient, effective means for obtaining reduced pressure control in vacuum distillations, etc. This device presents a simple, positive means for setting and maintaining any desired vacuum in a system. It eliminates all electrical appliances and no additional accessories are required other than shown in illustration.



The functioning is explained by the fact that when the pressure is reduced to the desired point in the manostat and system, equal pressure exists within the mercury-sealed bell chamber of the float and outside of it. The mercury therefore is at the same level.

As soon as stopcocks "A" and "B" are closed, it is obvious that any evacuation of the system can only be accomplished through the orifice "O" which is now just exactly in contact with the disc.

A leak (not exceeding the capacity of the pump) now causes increased pressure in the system and consequent mercury displacement downward outside the float and upward inside the float. The float then sinks, opening up the orifice and permits unrestricted exhaust which then restores equilibrium as the float rises and pushes the disc in contact with the orifice and throttles in effect of the pump as required.

Laboratory Computagram

High sensitivity and moderate capacity are combined in the Toledo Laboratory Computagram scale. With a sensitivity of ½ gram, or 1/64 of an ounce, and a capacity of five kilograms, this scale is well adapted for general laboratory use. A combination avoirdupois-metric chart has a graduation and figure for every gram. Also graduations as fine as 1/100 pound. This scale is also adapted for various plant uses such as weighing smaller, exacting proportions of ingredients for batches, packaging or testing.

Quality SODIUM SULFITE

(and other sulfites) by MALLINCKRODT

SULFITES

	Formula	*Typical* Assays*	*Calculated SO_2 Equivalent*	*Form*	*Solubility in Water*
AMMONIUM SULFITE	$(NH_4)_2SO_3+H_2O$	99% as $(NH_3)_2SO_3+H_2O$	47%	Small Granules	Freely Soluble
CALCIUM SULFITE	$CaSO_3+1\frac{1}{2}H_2O$	98% as $CaSO_3+1\frac{1}{2}H_2O$	44%	Crystalline Powder	Practically Insoluble
POTASSIUM SULFITE	K_2SO_3	98% as K_2SO_3	40%	Coarse Crystalline Powder	Freely Soluble
POTASSIUM META-BISULFITE	$K_2S_2O_5$	97% as $K_2S_2O_5$	56%	Granular or Powdered	Moderately Soluble
SODIUM SULFITE	Na_2SO_3	99% as Na_2SO_3	50%	Small Granular and Fine Powder	Freely Soluble
SODIUM META-BISULFITE	$Na_2S_2O_5$	90% as $Na_2S_2O_5$	61%	Granular or Powdered	Moderately Soluble

** These figures are determined at the time of manufacture. Over long storage periods changes may be expected since some of these chemicals have a strong affinity for oxygen.*

HEADQUARTERS FOR SULFITES

Used extensively by the photographic industry for which its high chemical quality and special physical form was originally developed, Mallinckrodt Sodium Sulfite, as well as other Mallinckrodt Sulfites, has become an important factor in all industries wherever high SO_2 content, uniformity, stability and general efficiency is needed.

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MALLINCKRODT CHEMICAL WORKS

INDUSTRY'S BOOKSHELF

Enzymology

ENZYME TECHNOLOGY, by *Henry Tauber.* John Wiley and Sons, Inc., New York, 1943; 275 pp., $3.50. Reviewed by *Ellery H. Harvey.*

WITHIN the modest space of 275 pages, the author presents a review of recent literature covering the preparation, role and use of enzymes in industry and medicine. With his first-hand familiarity with the subject matter because of his own researches in the field, and much experience in searching the literature, Dr. Tauber handles his material deftly, buttressing his statements with some 800 references. This is the accepted modern method of writing books on scientific subjects and provides the key to authoritative detail for those who need it, much of which had to be omitted of necessity from a book of this size.

Within the 16 chapters the author covers yeast production, various industrially important fermentations, significance of enzymes in the major food fields, and the use of enzymes in paper, textile and leather manufacture. The up-to-dateness of the book is best indicated by sections on penicillin and microbiological estimation of vitamins, both subjects of very recent development.

This book, well organized and attractively bound, will appeal to those interested in a brief survey of current trends in the rapidly expanding field of enzymology.

Magnetic Measurement

MAGNETOCHEMISTRY by *Pierce W. Selwood.* Interscience Publishers, Inc., New York, 1943; 287 pp., $5.00. Reviewed by *Charles D. Coryell,* University of California at Los Angeles.

PROFESSOR SELWOOD'S BOOK, which covers the applications of magnetic measurements to the solution of chemical problems, is the first to appear in this field in nearly a decade. This book is welcome especially in view of the great activity that has occurred in the field in a number of countries right down to the present day.

The description given of the various experimental techniques is good. There is a comprehensive presentation of the large variety of chemical problems that have been approached from the magnetic side. Over 1300 specific references are given to journal articles, most of these of recent date. Many interesting studies are presented in the 80 figures in the book.

The author has taken a practical point of view in the exposition, and one of the largest chapters is that on applied magnetometric analysis. The reviewer feels that the treatment of certain problems, such as the paramagnetism of atoms and of complexes of simple coordination geometry, might well have been augmented with more of the theoretical background, along the line of older extensive treatments of these topics (Van Vleck, Pauling).

The book is printed on good paper, and the make-up is excellent. It is recommended as an introduction to a fascinating and expanding field of pure chemical research in which there are still many problems to be solved, or it is recommended as a survey of the potentialities of a new tool for applied chemical research.

Treatise on Cellulose

THE CHEMISTRY OF CELLULOSE—by *Emil Heuser.* John Wiley & Sons, Inc., New York, N. Y., and Chapman & Hall, Ltd., London, 1944; 660 pp., $7.50. Reviewed by *Charles R. Fordyce,* Eastman Kodak Company.

A PREVIOUS BOOK on cellulose chemistry by this author, originally in German, was translated to English in 1924. The present volume, however, should not be regarded as a revision but as a new and more comprehensive treatise of the subject. It will be of interest to the advanced student as a text or to the chemist as a reference book on theoretical cellulose chemistry.

The book includes 15 chapters. Following a short introduction, these divide themselves into five phases of the field. Chapter 2 deals with the physical structure of cellulose; Chapters 3, 4, 5 and 6 with reactions of cellulose with water, alkalies, organic bases, ammonia, concentrated salt solutions, and cuprammonium hydroxide; Chapters 7, 8 and 9 with cellulose derivatives; Chapters 10, 11, 12 and 13 with oxidation and decomposition, and Chapters 14 and 15 with the molecular structure of cellulose.

Sections on alkali cellulose, cuprammonium hydroxide and cellulose xanthate are particularly to be recommended for thorough and authoritative treatment. In chapters on cellulose derivatives, industrial chemists will find unbalanced emphasis upon fields as related to their commercial value. The importance of partial hydrolysis of cellulose acetate should have been more clearly stressed. Cellulose acetopropionates and acetobutyrates, which are important commercial products, are dismissed with four lines. In the chapter on cellulose ethers, 13 pages are devoted to methyl ethers, while preparation of the ethyl ether, which is an important commercial product, is only briefly described.

From the theoretical point of view the subject matter throughout is well balanced and complete. Over two thousand references to original literature are included, superimposed upon which are opinions of the author, a fact which will be welcomed by those who desire an evaluation of literature data by a well qualified authority.

Revised Coatings Volume

PROTECTIVE AND DECORATIVE COATINGS, VOL. IV, *by J. Mattiello.* John Wiley and Sons, 1944. 418 pp., $5.00. Reviewed by *Ray C. Martin.*

THIS VOLUME in the series of publications under this title, like the previous volumes, is carefully prepared. Considerable time seems to have been spent in literature surveys and many references are made. All chapters under this subject and in particular, in this volume, are of more than passing interest to the paint chemist.

Chapter I—The phase of the applicability of "wetting" to dispersion, settling, etc., of paint and similar coatings should be of interest to the chemists dealing with this subject.

Chapter II—Various means of "grinding" and the relationship of thorough grinding to paint is well presented.

Chapter III—Chapter is purely academic and does not apply itself to any particular coating problem. Information is general.

Chapter IV—Flow curves and review of instruments for measuring this value is general. No specific problems cited.

Chapter V—Good review of common hiding power methods.

Chapter VI—Good evaluation which will enable the paint chemist to test and evaluate dried coatings.

Chapter VII—This chapter, dealing with coating structure, will enable the chemist to formulate coatings consistent with exacting requirements.

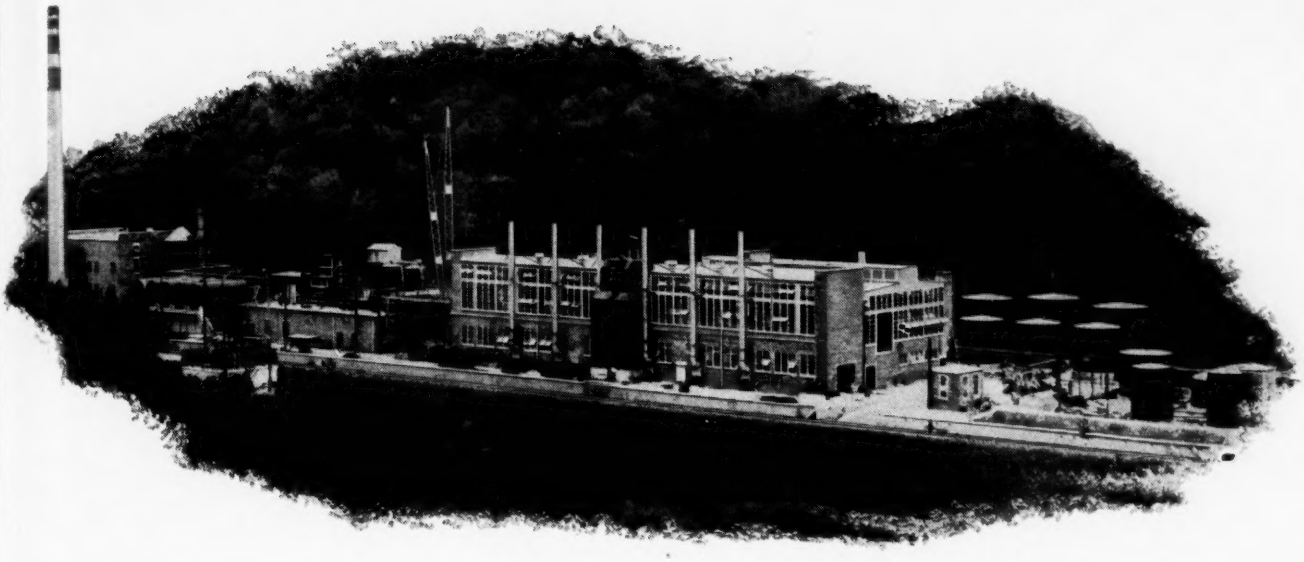
Chapter VIII—Interrelated in part to some phases of previous chapters. Not much literature on this subject. Information available good.

Chapter IX—Most information on microscopy is academic. Much should be heard of the electron microscope.

Chapter X—Hi-vacuum technology—general data high vacuum distillation is of interest.

Chapter XI—Chapter on emulsions is well presented and of timely interest.

Chapter XII—Absorption of ultra violet by drying oils—good collection of data on this subject, more than of passing interest.



RCI Announces Volume Production of Sodium Sulfate and Sodium Sulfite

New RCI Plant at Tuscaloosa, Alabama, Nears Peak Output

Again RCI measures up to the requirements of American industry. Paper manufacturers, in particular, will be interested in this latest evidence: Mounting production at RCI's new phenol plant has opened up a prolific source of much-needed Sodium Sulfate and Sodium Sulfite. Technical grades of both compounds are now being produced, and eventual capacity production should measurably alleviate shortages in these chemicals.

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A660. WATER TREATMENT. The Dorrco D-1 System of water treatment and its applications in the removal of simple hardness, the reduction of bicarbonate alkalinity, reduction of total solids, and metal recovery from trade wastes is well covered with explanations and diagrams in a new pamphlet recently issued. The Dorr Company.

Equipment

F135. OIL RECLAIMER. Units that are capable of restoring all kinds of lubricating, hydraulic, cutting and vacuum pump oils so that the reclaimed oil can be re-used in the same manner and place as the new oil are described in a new 4-page folder. Youngstown Miller Co.

F136. PAINT PAMPHLET. A vest pocket size folder "Ask Yourself" urges the paint manufacturer to consider now product development, production, purchasing, finance and accounting, marketing and distribution, personnel and general policy to meet the heavy competition of the future. Nat'l Paint Varnish and Lacquer Assoc.

F137. PLANT MAINTENANCE. A Buyers' Encyclopedia featuring more than 500 separate items in the industrial maintenance, safety, and fire protection fields will be of particular interest to municipal and manufacturing executives and others concerned with police protection, plant security, and purchasing. Factual data on such subjects as sizes and types of hose threads, nozzle and fire stream data, information on proper maintenance of fire hose, and types of extinguishers. General Detroit Corporation.

F138. POST-WAR EXPORT. A colorful booklet with charts of significant statistics and helpful information for laying the groundwork of planning for post-war export markets has been published. Simmons Products Co.

F139. POWER TOOLS. A significant use of plastics, the making of power tools, is described and very well illustrated in a highly colorful and attractive booklet recently published. The history, development, features and specifications of a new plastic-housed portable electric drill is covered. The factual data in the booklet aim at answering any questions of stamina that may arise from this heretofore untried application of plastic. Independent Pneumatic Tool Co.

F140. PULVERIZING, SEPARATING. Bulletin 53 describes the latest types of laboratory units for pulverizing and separating of practically any dry materials such as chemicals, foods, colors and the softer non-metallics, as well as a variety of manufactured products. Photographs and operating instructions are included. Raymond Pulverizer Division.

F141. PYROMETER ACCESSORIES. A new pyrometer accessory manual, No. P1211, giving engineering data on the selection and installation of thermocouples, protection wells, and lead wire; thermocouple and protection well assemblies; and calibration data and tables has been published. The Bristol Co.

F142. ROTAMETER. A colorful interesting catalog on the F&P Rotameter, the area-type flow meter for measuring the flow rate of liquids and gases. Included are a list of fluids successfully handled and some typical applications. Fischer and Porter Co.

F143. ROTARY PUMPS. A folder gives numerous illustrations and descriptions of rotary pumps with lists of liquids they are handling successfully. Blackmer Pump Co.

F144. SIGHT FLOW INDICATORS. Catalog 93-B illustrates and describes indicators for every industrial service. Sight flow indicators enable operators to determine whether or not fluid is flowing, the "flapper" type with a hinged apper which swings outward or upward to register the passage of fluid, the "drip-lip" type with a clearly visible lip so arranged as to register small or intermittent flow. Indicators for opaque flows or those with electric contacts to actuate external alarm devices are also shown. The new wheel type sight flow with turbine type blades that immediately shows low flows and changes in flows. Fischer and Porter Co.

F145. STEAM PLANT INSTRUMENTS. Those in steam plant or process industry concerned with preventing contaminated condensate from reaching boilers and prime movers will be interested in the 23-page, revised bulletin of the Catalog, "Micromax Condensate-Purity Instruments for the Steam Plant" recently issued. Leeds and Northrup Co.

F146. STORAGE. New efficient techniques in design, construction and equipment in storage and bulk handling of chemicals, oils, cement, coal, grain and liquids are diagrammed, illustrated and described in a 32-page booklet recently published. The Nicholson Co., Inc.

F147. TESTING EQUIPMENT. A new six-page booklet under the heading "Calibration of Testing Equipment" outlines in brief form the purpose and mechanism of verification of testing equipment. Included in it is a short description of the "Whittemore-Petrenko" proving rings used in calibrating compression equipment. Foster D. Snell.

F148. UNDERWRITING. A well-planned, illustrated booklet compiles information on the fifty years of safety service of the Underwriters' Laboratories.

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CANADIAN NEWS

by W. A. JORDAN

Operating Data Reported on Alcohol from Sulfite Liquor

CONSIDERABLE light has been cast on the economics of alcohol from a sulfite liquor production, long a controversial subject by a recent report on the operation of the Ontario Paper Co. plant at Thorold, Ontario. This data, compiled by Dr. C. A. Sankey, director of research, outlines observations from actual commercial production at the only functioning plant of this kind on the continent.

Noteworthy is the evidence presented to establish the eminent adaptability of the Melle system for the re-use of yeast to sulfite liquor fermentations. A full year of operation reveals that this method eliminates the problem of devitalization and infection of the yeast culture, minimizes the requirements of nutrient salts, and enhances the alcohol yield. Yeast is at present being used which has been recycled more than 240 times.

Process improvements have also resulted in a paring of fermentation time to almost a third of the minimum recorded in prewar European installations.

According to records tabulated for the first 25 days of May, 198,900 gallons of waste sulfite liquor, containing 26,600 pounds of fermentable sugars, were transferred from alcohol storage to the alcohol plant. With an average fermentation time of 15.2 hours, alcohol production was equivalent to one gallon per 148 gallons of sulfite liquor from storage, or applying the dilution factor of 0.8, one gallon per 118 gallons of concentrated liquor from the digester.

The only nutrient required per 100 gallons of ethyl alcohol was 11.8 pounds of urea; lime consumption, on the same basis, was 443 pounds; sulfuric acid (for yeast conditioning) 20.9 pounds.

The quality of the alcohol produced exceeded U. S. Army Specification No. 1, with sulfur content between 1.4 and 2.1 parts per million, or well within the requirements of any known commercial specifications.

Penicillin Production

Canadian production of penicillin is now on a commercial scale at two Crown-owned units, operated by Connaught Laboratories, Toronto, and Ayerst, McKenna, and Harrison Ltd., Montreal. Both of these Government plants are utilizing the flask method, and the entire output is at present being supplied to the armed services.

A third Canadian unit, and the first privately financed, was completed and brought into production by Merck and Co. Ltd., during the month. The Merck project, which incidentally was in operation within six weeks of the date of installation of the first piece of equipment, is a deep tank producer and employs the sterile soil means of maintaining a master culture.

Although total output of the three units is currently being devoted to military needs, a limited quantity of penicillin imported from the U. S. A. has recently been made available for civilian purposes.

Culture incubation room in the Crown-owned penicillin plant operated by Ayerst, McKenna and Harrison Ltd., Montreal. Plant uses the flask method.

Aluminum Ltd. Acquires Jamaica Bauxite

Aluminum Ltd., through a wholly owned subsidiary, Jamaica Bauxite Ltd., has acquired holdings on the island of Jamaica and has started development work on what promises to be an important bauxite deposit. Ore from the Jamaica workings may be employed, eventually, as alternative or supplemental to the British Guiana material currently shipped to the huge Aluminum Co. of Canada Ltd. refineries.

Although wartime conditions hamper immediate exploitation, a program for extensive postwar development has been drafted, which includes the construction of a modern ore processing plant at Jamaica. About 160 men are now employed in surveying and drilling and a chemical laboratory has been established at Mandeville, the company's headquarters.

DDT in Canada

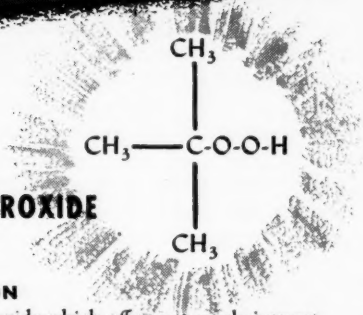
The most discussed chemical in Canada today, is, without a doubt, the super-insecticide DDT. Government entomologists are conducting extensive investigations to appraise its potential value, particularly as an agricultural insecticide base, and for the control of forest pests. Furthermore, several chemical companies are studying the possibility of manufacturing DDT in Canada, and although one organization, at least, has designed a plant and selected a tentative site, as yet the Dominion is entirely dependent upon allocated imports of DDT from the U. S. A.

Government officials admit that it is difficult, at this time, to set a limit on the extent to which DDT may be used in Canada, but point out that agricultural arsenates are among the most likely materials to be replaced, if DDT can be proved to be relatively safe in use. Roughly 2,000 tons of lead arsenate, 1,800 tons of calcium arsenate, 600 tons of Paris green, and 75 tons of nicotine sulphate, comprise the annual consumption of Canadian agriculturists. Pyrethrum and rotenone imports total some 150 tons annually.

A tremendous market would be created if DDT proves to be suitable for the control of forest pests. Officials state that a

(*Turn to page 266*)

Two PEROXIDES with Interesting Possibilities



* t-BUTYL HYDROPEROXIDE

GENERAL DESCRIPTION

A new, organic, alkyl peroxide which offers extremely interesting possibilities. It is standardized at a concentration of 60% (10.66% available oxygen). Use of the proper activators increases the rate of release of the oxygen.

SUGGESTED USES

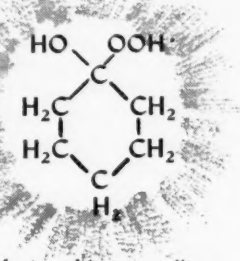
1. As a catalytic agent in one or two phase polymerizations. **t-Butyl Hydroperoxide has proved to be an excellent catalyst for polymerizing Styrene, as well as certain Elastomers such as Buna S.**
2. As an accelerator in the curing of snythetic resins.
3. As an accelerator in the vulcanization of certain synthetic rubbers.
4. As an oxidation agent for laboratory purposes
5. As a drying accelerator in oils, paint, varnishes, etc.
6. As a combustion accelerator for heavy fuel oils used in Diesel engines.

PROPERTIES

Molecular Weight		90
Specific Gravity @ 25° C. (60% concentration)		0.859
Boiling Range	"	90° to 107° C.
Freezing Point	"	−35° to −36° C.
Flash Point	"	18.3° C.
Refractive Index @ 25° C. (60% concentration)		1.3960
Available Oxygen	"	10.66%
Color	"	Water White
pH of 1 part 60% Conc. in 10 parts water		4
Stability		Completely stable up to 76.6° C.
Solubility:	60% concentration in water	11%
	Water in 60% concentration	5%
	In short chain aliphatics	Excellent
	In aromatics	Excellent

ACTIVATORS

Benzoquinone and other similar organic reducing agents have proved to be efficient secondary catalysts in polymerization reactions (when used in quantities up to 0.1% of t-Butyl Hydroperoxide), greatly increasing the efficiency of polymerization. When use requires quick release of oxygen, the same proportions of Benzoquinone mentioned above have proved efficient.



* 1-HYDROXYCYCLOHEXYL HYDROPEROXIDE-1

GENERAL DESCRIPTION

A new, organic, cycloalkanyl peroxide in white crystalline solid form that is extremely stable at room temperature and possesses 12.13% active oxygen.

POSSIBLE USES

1. As a Mild oxydizing agent.
2. As a catalyst for various polymerizations.
3. As a bleaching agent.
4. As a drying accelerator in paints, oils and varnishes.
5. As the ingredient source of active oxygen in face creams and similar products.

PROPERTIES

Molecular Weight	132
Melting Point	76-78° C.
Active Oxygen	12.13%
Stability:	Excellent at room temperatures. Explodes only mildly when heated over a flame on a steel spatula.
Solubility:	Soluble in organic solvents. Insoluble in water.

Both of these interesting peroxides are nearly as new to us as they doubtless are to you. We have given above practically all the technical information concerning them known at present. t-Butyl Hydroperoxide is now in limited commercial production, and samples will be gladly sent anyone interested in investigating its possibilities. 1-Hydroxycyclohexyl Hydroperoxide-1 has been produced successfully in our laboratory on a small scale and can be made in commercial quantities if there is sufficient interest in the product. Samples will be gladly made up upon request. Address all inquiries to the Union Bay State Chemical Company, Peroxide Division, 50 Harvard Street, Cambridge 42, Massachusetts.

* U. S. Pats. 2176407, 2223807 & 2298405

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UNION BAY STATE
Chemical Company

Canadian Review

(*Continued from page 264*)

complete kill is realized in small area dustings, but they express the fear that too many insects might be killed if DDT were used more or less at random.

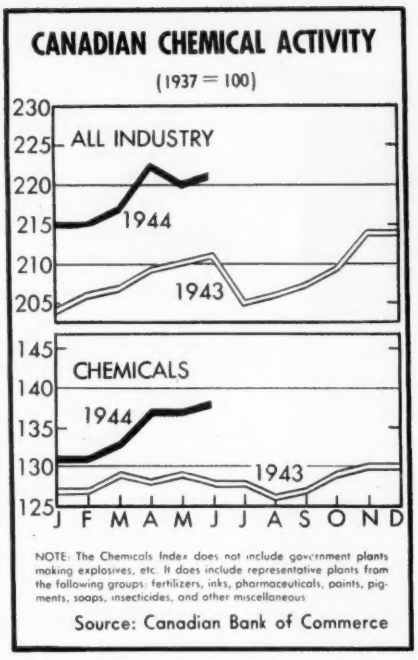
Production of Wheat Starch Established

The first commercial production of wheat starch and wheat gluten in Canada is scheduled for late this month at the Fort William plant of Ogilvie Flour Mills Co., Ltd. This Fort William mill, formerly used for the manufacture of flour, has been idle for several years.

Most of the machinery needed for the new production has been installed and will process 25 tons of wheat flour a day. From this flour 15 tons of wheat starch and 3 tons of gluten will be prepared. Although initial operations will be on a modest scale, officials state that the plant is so designed that production can be stepped up readily should market conditions warrant.

A rather anomalous situation has existed in Canada for some years as far as starches are concerned, for although predominantly agricultural, the Dominion has never approached self-sufficiency in this respect. Sizeable corn starch units operate in Canada, but they have been supplied primarily with corn imported from the U. S. A., South Africa, or South America.

Similarly, heavy tonnage of tapioca and potato starches have been imported for the textile, adhesive, and paper trades, from the East and Europe. Even though potato starch producing facilities have been expanded in the last few years, to replace non-available imports, supply has still continued to fall short of consumer demand.



New Unit to Make Se and Te Salts for Export

A $100,000 unit for the manufacture of salts of selenium and tellurium, and to provide expanded facilities for research and development projects, is being constructed by Canadian Copper Refiners, Ltd., Montreal.

This Noranda-controlled organization has been producing several grades of selenium and tellurium since 1934, and more recently began the manufacture of selenium dioxide. Present plans call for the production of a wide range of these metallic salts.

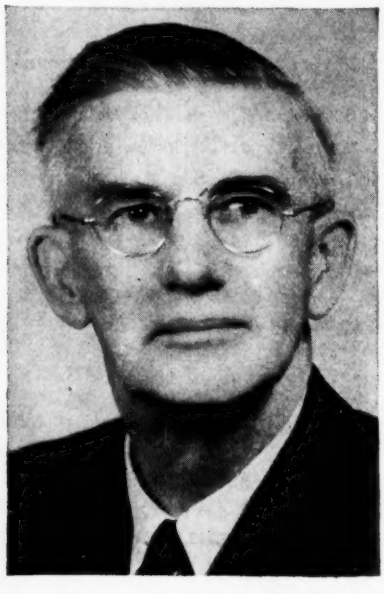
Practically the entire output of the new unit will be exported, primarily to the U. S. A. and Great Britain.

Nylon Raw Materials Duty Free

A modification has been made recently in Canadian Customs Tariff categorizations which places hexamethylene diammonium adipate, hexamethylene diammonium sebacate, and caprolactam, three chemicals used in the manufacture of nylon polymers, on the duty free list.

Although C. I. L. officials maintain that the removal of the former 17½ cent import duty is of no immediate significance as far as construction of a Canadian polymer producer is concerned, it is conceded that the possibility of "eventual" establishment of such a unit to supply domestic nylon finishing facilities is being considered.

Directs New Department



A. F. G. Cadenhead, recently appointed director of the new Department of Chemical Development of Shawinigan Chemicals Ltd., will be headquartered in Shawinigan Falls.

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NEWS OF THE MONTH

Final Plans Issued on Alcohol Release

Revised estimates of requirements presented to Advisory Committee. Four plants continue producing Government alcohol.

FINAL plans for releasing alcohol production facilities from the war program during August were issued by WPB's Industrial Alcohol Producers Industry Advisory Committee, following its meeting of July 20.

Dr. Walter G. Whitman, assistant director and head of the Basic Chemicals Division of the Chemicals Bureau, presented the revised supply and requirements figures for 1944 and 1945 to the committee.

At the present time, Dr. Whitman said, it is estimated that 604,000,000 gallons of 190 proof alcohol will be required in 1945 against an estimated potential supply of 639,800,000 gallons. Requirements estimates for 1944, as now revised, call for consumption of 614,300,000 gallons against an earlier estimate of 633,900,000 while the supply estimate has been revised to 586,200,000 gallons from the earlier figure of 612,000,000 gallons.

Revised estimates of requirements in terms of millions of gallons of 190 proof alcohol follow:

	1943	1944	1945
Synthetic rubber	126.	342.4	335.
Direct military and lend-lease	102.9	81.2	89.
Indirect military and civilian	147.9	160.7	160.
Anti-freeze	50.9	30.	20.
	427.6	614.3	604.

In response to inquiries from committee members regarding the possibility of future releases of the facilities for beverage production, Dr. Whitman said that while the outlook was favorable, no further release seems possible for several months. The lowered stock figure to result from the August release will make it necessary to retain all the facilities in the war program until the stockpile can be replenished.

Of the 98 registered distillers who have made their plans known to date, only seven have indicated that they will not take part in beverage production. Three of these reported that because of various conditions they would not be able to produce alcohol for either beverage or war use during August. Four others reported that they would continue to produce 190 proof alcohol for the Government.

The following industrial alcohol producers have reported that they will avail themselves of the opportunity to divert 50 per cent of their production to beverages during August: Clinton Products Co., Clinton, Iowa; Publicker Commercial Alcohol Co., Philadelphia, Pa.; Pennsylvania Alcohol and Chemical Co., Philadelphia; Genesee Brewing Co., Rochester, N. Y.; Lac Chemicals, Inc., Culver City, Calif.; Gulf Distilling Corp., Gretna, La.; Bisceglia Distilling Corp., Peoria, Ill.; Boeckler Associates, Trenton, Michigan; Yankton Industrial Alcohol Corp., Yankton, S. Dak.; Midwest Solvents Co., Atchison, Kans.

Distillers having difficulty obtaining barrels were urged to get in touch with the WPB Containers Division.

FTC Investigates Phosphate Export Association

The Federal Trade Commission announced on July 19 an investigation had been ordered under the Export Trade Act to determine whether the Phosphate Export Association of New York and the Florida Hard Rock Phosphate Export Association of Savannah, Ga., have entered into illegal agreements and engaged in practices in restraint of trade.

Among the members of the Phosphate Export Association are listed the American Agricultural Chemical Company, the American Cyanamid Company, Coronet Phosphate Company, the Phosphate Mining Company and the Southern Phosphate Corporation, all of New York.

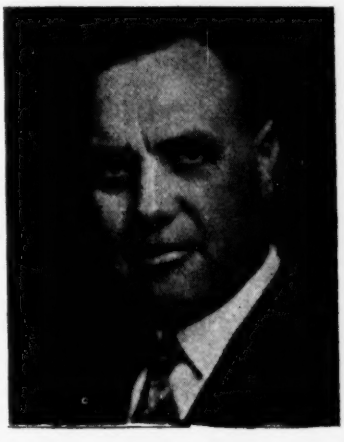
Donald B. Keyes Heads OPRD

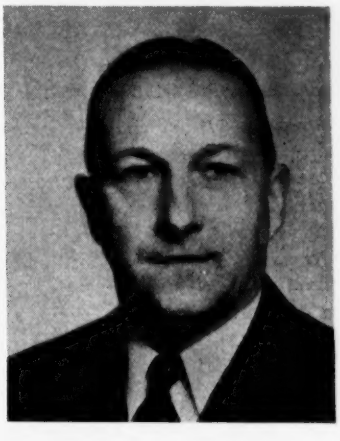
The War Production Board has announced the appointment of Dr. Donald B. Keyes as director of its Office of Production Research and Development. Dr. Keyes succeeds Dr. Harvey N. Davis, who will devote his full time to duties as president of the Stevens Institute of Technology, Hoboken, N. J.

The new director has served OPRD since its inception in November, 1942, as chief of the Chemical Industries Branch and chairman of the Chemical Referee Board. Previously he had been head of the Chemistry Section of the Civilian Supply Division of the former Office of Price Administration and Civilian Supply and chief consultant of the Chemicals Branch of WPB.

Dr. Keyes came to the Government from the University of Illinois where he had been head and Professor of the Chemical Engineering Division. He has had broad experience in industry, education and Government.

LeVan and Priestly Elected New Union Carbide Unit Heads





E. E. LeVan, right, has been elected president of Haynes Stellite Co., a unit of Union Carbide and Carbon Corporation. William J. Priestley, left, has been elected president of Electro Metallurgical Co., Electro Metallurgical Co. of Canada, Ltd., Michigan Northern Power Co., and Union Carbide Co. of Canada, Ltd., Units of Union Carbide and Carbon Corporation. Both men succeed the late Francis P. Gormely.

New Jersey Leads as Chemical Producer

New Jersey leads the nation in the production of chemicals, according to statistics made public by the American Chemical Society, which holds its 108th meeting in New York City September 11 to 15 under the auspices of the Society's North Jersey section. In a single year, New Jersey chemical industries manufacture same $200,000,000 worth of chemicals, about 20 per cent of all those made in the United States.

"New Jersey is the most important factor in drug grinding in the world and through its ports and factories are funneled most of the essential rare and common drugs for medicinal products," it was stated.

New Jersey produces about $88,000,000 worth of paints, pigments and varnishes, or about 16½ per cent of the national total. The State has 7 2-10 per cent of all the chemical establishment in the United States. It has about 4 per cent of the compressed gas plants, and 8 per cent of its employes; 5 per cent of all drug and medicine establishments and 8 per cent of its employes; 5½ per cent of explosive plants, and 26 per cent of its employes.

Hovey Appointed General Mills Chemical Development Head

Almon G. Hovey has been appointed executive in charge of the new chemicals development section of General Mills research laboratories, A. D. Hyde, vice president in charge of research, has announced. Mr. Hovey joins the General Mills staff with a background of 20 years experience in the field of synthetic resins.

Surplus Chemicals Listed

The Reconstruction Finance Corporation has issued a list of chemicals which have been declared surplus war property by other owning agencies, so as to permit disposition of these holdings.

Up to July 15 the list showed: coal, crude petroleum and related crude hydrocarbons, $62,810 reported, none sold; aluminum ores, tailings and unrefined aluminum products, $1,020, none sold; petroleum and coal products except raw materials for chemical industries, $19,067, none sold; chemicals, $47,645, none sold; heavy chemicals, $13,318 reported, $13,001 sold at cost, leaving $317 on hand; industrial, industrial fine, and related chemicals, $577,923 reported, $77,437 sold; against a cost of $78,500, leaving on hand $499,403 worth; intermediates cylics, $811, none sold; miscellaneous organic chemicals, $84,032, none sold; miscellaneous chemicals, $605, none sold.

An itemized list of chemicals which have been declared surplus war property, giving discription, quantity, and point of storage for each lot, may be obtained from the Surplus War Properties Administration of the Defense Supplies Corporation.

Channel Black Use Curtailment Asked

Increased demand for easy-processing channel carbon black has reduced production in the channel black industry by approximately 15 per cent and caused the Chemicals Bureau to request all members of the rubber industry to replace their easy-processing channel black requirements with medium processing channel black to the fullest possible extent, the War Production Board reported.

Where the direct substitution is not possible, Chemicals Bureau officials suggested a bland with semi-reinforcing furnace of high modulus furnace, or use of high modulus alone. Officials said that this could be done without any loss in quality in the finished product and, in many cases, would result in an improvement.

Because of the increased demands, Chemicals Bureau officials said that it had in many cases been necessary to deny or cut August allocations for channel carbon black.

This situation is expected to be cleared up by the end of the year, officials explained, since new production of both channel and furnace carbon blacks is scheduled to be brought in each month throughout the rest of the year. However, there is enough carbon black now being produced and in stock to meet 1944 requirements fully, it was asserted.

Arsenic Output Curtailed

As a result of curtailed production in some arsenic mines, the over-all output of arsenic in 1945 will be smaller than that of 1944, a Mining Division representative predicted at the recent meeting of the Arsenical Insecticides Manufacturers Industry Advisory Committee, the War Production Board has reported.

Cotton farmers in the South should be prepared with stocks of calcium arsenate or other arsenicals for possible leaf worm infestations during August, Chemicals Bureau officials told the committee.

Bird Heads Lederle Research

Dr. John C. Bird has been appointed director of development research for Lederle Laboratories, Inc., New York and Pearl River. Dr. Bird was formerly vice-president and technical director of the Vitamin Division of the Vick Chemical Company, New York.

DDT Sample Allowance Increased

In view of increased DDT production, representatives of the Chemicals Bureau told the DDT Producers Industry Advisory Committee that more liberal allowances would be made to producers for sample distribution, but the amount available for such distribution still will be limited by the necessity of meeting military requirements.

Present producers of DDT are: Merck & Co., Rahway, N. J.; Hercules Powder Co., Wilmington, Del.; Cincinnati Chemical Works, (an affiliate of J. R. Geigy, Basle, Switzerland), Cincinnati, Ohio; E. I. du Pont de Nemours, Wilmington, Del.; General Chemical Co., New York City; Monsanto Chemical Co., St. Louis, Mo.; Elko Chemical Works, Clinton, N. J.; J. T. Baker Chemical Co., Phillipsburg, N. J.; Sherwin Williams, Chicago.

Prospective producers not yet in volume production are: Pennsylvania Salt Manufacturing Co., Philadelphia; Michigan Chemical Co., St. Louis, Mich.; American Home Products Co., New York City; Pharma Chemicals Co., New York City.

Pulp Supply Declines

Wood pulp inventories at mills throughout the United States have declined to critically low levels and threaten to bring about a drastic curtailment in paper and paperboard operations unless the volume of pulpwood deliveries and waste paper

collections is accelerated, trade quarters have warned.

WPB officials last week announced that eight New England white paper mills will receive sufficient pulp to permit operations for only three and a half days a week, resulting in a production cut of from 25 to 30 per cent unless offset by a commensurate increase in waste paper receipts. It was also revealed that more than 700 paper mills throughout the nation will be dependent upon waste paper collections for the maintenance of production levels as a result of the new pulp reduction.

Goodrich Chemical Division in Operation

The recently established Chemical division of The B. F. Goodrich Company is now located in Cleveland it is announced by W. S. Richardson, division general manager. The division is established in the Ross building, Prospect ave. and East Ninth st., in 18,000 square feet of floor space.

Distribution and technical service to processors of the company's line of Geon vinyl resins, introduced this year, rubber chemicals, synthetic rubbers and reclaim rubbers in raw material form will be handled from the Cleveland office, Richardson said. A development laboratory is included.

Executives and other personnel who will staff the offices have formerly been stationed in the company's general offices in Akron. Approximately 125 are affected by the move.

The 18,000 square feet of the new location have been remodeled into a series of glass block offices and a modern laboratory in which chemicals and plastics manufactured by the company for war uses will be developed, tested and demonstrated.

Annand Issues Warning On DDT

DDT, much publicized as a louse powder and fly spray, is not a universal insecticide, effective for all agriculturai purposes, the Department of Agriculture has warned farmers.

Dr. P. N. Annand, chief of the Bureau of Entomology and Plant Quarantine, said that DDT is not now available for civilian use. "While it appears to be very promising for future control of many insect pests, many of the experiments to test its effects on insects, plants and higher animals are still in preliminary stages," he added. "Later tests may change the entire picture materially. Our entomologists have not had large enough supplies available to make large-scale tests. Consequently, we are not in a position at this time to recommend general use of DDT as an insecticide for agricultural purposes."

Tests for agricultural uses of DDT are being conducted in a number of laboratories by the Bureau of Entomology and Plant Quarantine with the small amounts of DDT now available for experimental purposes.

U. S. Drug Trade Hampered In South America

Through lack of efficient distribution methods, American drug manufacturers have been prevented from taking advantage of potential Latin American markets, T. W. Delahanty, chief of the Drugs and Pharmaceuticals Unit, Bureau of Foreign and Domestic Commerce, has declared.

The principal barrier, he said, is inherent in the fact that the European therapeutic systems are dominant in Latin America and the French Pharmacopoeia, or Codex has, until recent years, been the standard reference, except in British possessions.

The next important barrier, Mr. Delahanty states, arises from an underestimation, on the part of present or potential exporters, of the prospective worth of the South American market.

Kindig to Head Sherwin-Williams Industrial Division

The appointment of M. A. Kindig as assistant general manager of the industrial division, The Sherwin-Williams Co., is announced by G. H. Robertson, general manager. His new position will revolve especially around industrial finishing.

Martin Presents New Chemical Study Method

A means of studying areas of less than one-one hundred millionth of a square inch to determine their chemical makeup was reported by Dr. Ladislaus L. Marton, Associate Professor of Electron Optics at Stanford University, at a meeting on July 22 of the Pacific Coast section of the American Physical Society.

It was possible through the method, he said, not only to analyze "much smaller particles" than had been possible hitherto but to examine extremely fine mixtures which could not be separated by chemical or mechanical means.

Dr. Marton, a pioneer in the development of the electron microscope, has joined an electron spectroscope to the 100,000-volt electron microscope designed and built at Stanford. The attachment, which, he said, could be made to any electron microscope provided with a means for "end-on" observation, replaces the transparent fluorescent screen used for viewing the image in the microscope.

A.S.T.M. Adhesives Committee Organized

An important new standing technical committee has been organized by the American Society for Testing Materials to function in the field of adhesives. This committee, having been authorized by the Society some months ago, was formally organized at a meeting at A.S.T.M. headquarters in Philadelphia late in June, at which the technical men who are serving as members of the committee, representing leading producers and consumers of adhesives, discussed problems in connection with scope, important activities which needed to be started, personnel, and so on.

T. R. Truax, principal wood technologist, U. S. Forest Products Laboratory, Madison, Wisconsin, who had been appointed temporary chairman of the commitee, presided at the meeting. Other temporary officers who will serve are P. H. Bilhuber, Steinway & Sons, New York vice-chairman, and Henry Grinsfelder, senior engineer, Resinous Products & Chemical Co., Philadelphia, secretary.

A preliminary statement of scope of the committee is as follows: The formulation of specifications, methods of test, and definitions of terms pertaining to adhesives, including animal, vegetable, mineral, and synthetic types.

Following the set-up of most A.S.T.M. technical committees, a number of subgroups are being appointed to be responible for specific projects in this field of activity. A list of the subcommittees with some indication of their responsibilities follows: I, Subcommittee on Strength Tests (M. H. Bigelow, Chairman), shear, tension, compression, torsion, vibration, etc.; II, Subcommittee on Analytical Tests (Leonard Repsher, Chairman), viscosity, acidity, fillers, etc.; III, Subcommittee on Tests for Permanency (F. J. Wehmer, Chairman), moisture, temperature, chemicals—oils, salt, etc., microorganisms, etc.; IV, Subcommittee on Working Qualities (C. B. Hemming, Chairman), working life, assembly time, rate of setting, gluing pressure, etc.; V, Subcommittee on Specifications (Gerald Reinsmith, Chairman), synthetic resins, starch, animal, casein and vegetable proteins, cellulose, mineral, rubber, bituminous, etc.; VI, Subcommittee on Nomenclature and Definitions (G. M. Kline, Chairman).

INDUSTRY ADVISORY COMMITTEES

Fatty Acid Manufacturers

Representatives of virtually every manufacturer engaged in the business of distilling and splitting fatty acids of various types have been appointed to a committee that will assist the Office of Price Administration in formulating pricing actions affecting the industry, the agency has announced.

Fatty acids are used principally as cutting and cooling oils in the manufacture of chemicals and soap. The industry represented on this committee also manufactures stearic and oleic acids, as well as hydrogenate fish oils. It does an annual business estimated at $57,000,000.

Members of the committee, known as the Fatty Acid Manufacturers Industry Advisory Committee, are as follows: H. G. Bissinger, E. F. Drew and Co., Inc., N. Y.; Phillip Brendel, Southern Cotton Oil Co., N. Y.; Howard Dock, M. Werk Co., Cincinnati, O.; R. A. Duncan, Procter and Gamble Co., Ivorydale, O.; Edward W. Freundt, Armour and Co., Chicago, Ill.; Frank C. Haas, Werner G. Smith Co., Cleveland, O.; Dr. W. T. Reddish, W. C. Hardesty Co., N. Y.; A. W. Schubert, Emery Industries, Inc., Cincinnati, O.; August J. Spieler, Celina Stearic Acid Co., Celina, O.; Clarkson Taylor, Harknew and Cowing Co., Cincinnati, O.; D. L. Weatherhead, Darling and Co., Chicago, Ill.; Stanley Goranflo, Wilson & Co., Inc., Philadelphia, Pa.; David Mahany, A. Gross and Co., N. Y.; A. G. H. Reimold, Woburn Chemical Co., Harrison, N. J.

Rotenone Dust Mixers

Western mixers of various agricultural insecticide and fungicide dusts containing rotenone in different forms and amounts will be represented on a five man industry advisory committee that will consider pricing actions to be taken on such commodities, the Office of Price Administration has announced.

The five men who will serve on this committee—Western Rotenone Dust Mixers Industry Advisory Committee—are as follows: A. J. Flebut, California Spray-Chemical Corp., Richmond, Calif.; R. A. Lamoree, Stauffer Chemical Co., San Francisco, Calif.; Roy E. Miller, Miller Products Co., Portland, Ore.; D. A. Zannette, Chipman Chemical Co., Palo Alto, Calif.; Elmer J. Davis, Los Angeles Chemical Co., Los Angeles, Calif.

Coumarone-Indene Resin Manufacturers

At the first meeting of the Coumarone-Indene Resin Manufacturers Industry Advisory Committee, members discussed means of obtaining an improved distribution of Coumarone-Indene resin for military and essential civilian requirements, the War Production Board has reported.

Coumarone-Indene resins, which are light-oil fractions distilled from coal tar and polymerized into resins, are used chiefly in the compounding of synthetic rubber, protective coatings, adhesives and floor tiles.

Members of the newly-formed committee are: Lee V. Dauler, The Neville Co., Pittsburgh; R. W. Ostermayer, Pennsylvania Industrial Chemical Corp., Clairton, Pa.; R. C. Quortrup, The Barrett Division, Allied Chemical & Dye Corp., N. Y.

George H. Sollenberger is the Government presiding officer of the committee.

COMPANIES

Diamond Alkali Build Bichromate Unit

Work has begun on construction of an addition to the standard chromate division of the Diamond Alkali Co.'s plant in Painesville, Ohio, which, when completed, is expected to increase the plant's capacity for producing bichromate of soda, an extremely valuable war material, by 35 per cent.

The expansion, spokesmen said, was undertaken at the request of the War Production Board. Diamond Alkali's chromate plant is already one of the largest producers in the country.

Western Electrochemical Enlarges

Jesse Jones, Secretary of Commerce, has announced that the Defense Plant Corporation has authorized an increase in its contract with Western Electrochemical Company, Los Angeles, Calif., to provide additional plant facilities at Los Angeles at a cost of approximately $100,000, resulting in an overall commitment of approximately $500,000. The Western Electrochemical Company will operate these facilities, title remaining in Defense Plant Corporation.

Union Carbide Reports Earnings

Union Carbide and Carbon Corporation reports for the second quarter, ending June 30th, 1944, net income of $9,122,836.69, equal to 98.33 cents a share on 9,277,788 shares, after provision for taxes, but before renegotiation.

Second quarter earnings of 98.33 cents a share compare with $1.0451 a share in the second quarter of 1943, and 97.10 cents a share in the first quarter of 1944.

Du Pont Sales Ahead of '43

E. I. du Pont de Nemours & Co., and wholly owned subsidiaries report net sales for the six months ended June 30, excluding the value of products manufactured in Government owned plants, of $303,390,223, compared with $275,978,230 in the first six months of 1943.

Net income for the period this year amounted to $34,052,469 equal, after preferred dividends, to $2.72 each on 11,109,697 common shares, compared with $29,555,500 or $2.32 each on 11,109,292 shares in the six months last year.

For the quarter ended June 30 the company reported net income of $16,809,607 equal, after preferred dividends, to $1.34 each on 11,109,682 common shares, against $14,816,186, or $1.16 each on 11,108,495 common shares in the 1943 quarter.

Freeport Sulphur Earnings Reported

Net income of Freeport Sulphur Company, for the quarter ended June 30, 1944, after all charges, including depreciation, depletion and $393,000 reserve for taxes, amounted to $664,436, or 83 cents per share of common stock, Langbourne M. Williams, Jr., president, reported to directors. Of these earnings, $112,354, or 14 cents a share, represented the company's portion of the net earnings of its subsidiary, Cuban-American Manganese Corporation.

At the meeting held July 26th, the Board of Directors declared a regular quarterly dividend of 50 cents per share.

Company Notes

STAUFFER CHEMICAL COMPANY has acquired 28 acres of land at Bentonville, Va., on which to erect a $500,000 plant for the manufacture of carbon bisulphide. Work on the main building and several smaller structures will begin soon and construction should be completed within six months.

COMPAGNIE DUVAL, 121-123 East 24th Street, New York, has been purchased by S. B. Penick & Company, 50 Church Street, New York, it was announced. According to officials of the latter company, the Duval personnel will continue to serve its many foreign and domestic customers, and will become a unit of the Penick Essential Oils and Aromatic Chemicals Division.

CONTINENTAL CAN COMPANY, INC., has moved its Eastern Division offices from 100 East 42nd Street, general headquarters of the Continental organization, to the eighth floor of the Chanin Building, 122 East 42nd Street.

A certificate of partnership has been filed in Buffalo, N. Y., for the BUFFALO

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CHEMICAL Co., 661 Wyoming St. Partners are Clara Blumenthal, Fanette Goldman, Carolyn Greenfield, Lillian Hirsch and Dolores Klumpp.

PALMER-SCHUSTER COMPANY of Cleveland, who handle chemicals, alkalis, pigments, colors, etc., recently gave up operating their own warehouse and moved to new offices at 1531 W. 25th St., Cleveland.

WARWICK CHEMICAL COMPANY'S new Richmond Works plant at Wood River Junction, Rhode Island, which was ceremoniously dedicated on June 28th, began operation in August. This will be the fourth operating unit for Warwick Chemical Company. Sales offices are at 580 Fifth Avenue, N. Y., and a research laboratory at 221 West 57th Street, N. Y.

PITTSBURGH PLATE GLASS COMPANY has broadened the scope of its activities in the paint field by the acquisition of a substantial interest in The Murphy Paint Company, Ltd. of Canada, it was announced by H. B. Higgins, Pres.

JOSEPH TURNER AND Co. has moved its Chicago office from 3958 Calumet Avenue to 435 N. Michigan Ave., Chicago 11, Illinois. The telephone number is Whitehall 4663.

THE AMERICAN VISCOSE CORPORATION, New York, has appropriated funds for the purchase of additional equipment for the company's plants at Nitro, W. Va., and Meadville, Pa., which will be obtained as soon as conditions permit its purchase.

Army-Navy "E" Awards

The following companies have recently been awarded the Army-Navy "E" for excellence in production of war materials.

Dixie Ordnance Works, Sterlington, Louisiana.

Esso Laboratories, Linden, New Jersey—Third Star added.

Gilbert and Parker, Springfield, Mass.

The Mathieson Alkali Works, Saltville, Va.

Hooker Electrochemical Co., Niagara Falls—Third Star added.

Kuilema Heads New Penn Salt Office

Louis M. Kuilema has been appointed district sales manager in charge of the newly opened sales office of the Pennsylvania Salt Manufacturing Co. in Cincinnati, Ohio. He formerly was with the Paper Makers Chemical Department of the Hercules Powder Company.

ASSOCIATIONS

A.A.T.C.C. Resumes Meetings

The American Association of Textile Chemists and Colorists, having cancelled its annual meetings since the start of the War, will resume them again this fall. A 3-day program—October 12th to 14th, at Atlantic City, New Jersey, is being arranged for the exchange of technical information among its 3,000 members. The Philadelphia section under the general chairmanship of C. A. Seibert of duPont will act as host. One of the most interesting features planned is a symposium on "The Textile Chemist in the Post-War World" with Dr. William D. Appel, president of the A.A.T.C.C., presiding, and with three outstanding speakers: Dr. Samuel C. Lind, Dean of the Institute of Technology, University of Minnesota and former president of the American Chemical Society; Dr. Hugh S. Taylor, chairman of the department of chemistry, Princeton University; and Andrew Fraser, Jr.

A.C.S. Rubber Division Cancels Meeting

Because of wartime conditions, the Rubber Division of the American Chemical Society has cancelled its 1944 annual meeting, scheduled for New York City in mid-September, Harold Gray, chairman of the division, has announced. Gray is technical superintendent of the B. F. Goodrich tire division here.

PERSONNEL

Crowe to Join Heyden

James M. Crowe, managing editor of *Chemical Industries,* will join Heyden Chemical Corporation on September 1 to handle that company's advertising and market development work. Mr. Crowe leaves *Chemical Industries* after four and a half years as a member of the editorial staff, during which time he has been identified closely with many of the editorial and production activities of the magazine and the *Buyers Guidebook Number.*

Thompson-Hayward Executive Shift Made

Charles T. Thompson has announced his taking a new title and office in the Thompson-Hayward Chemical Company, that of chairman of the board. The new president is George M. Hayward, with the company virtually from its inception and up to now executive vice-president.

The Thompson-Hayward Chemical Company, distributor of industrial and agricultural chemicals through fifteen warehouses and sales offices in as many cities, has its headquarters in Kansas City.

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Remmers Names Kurfees Vice-President

A. R. Remmers, secretary since 1937 of the J. F. Kurfees Paint Company, manufacturers and jobbers, Louisville, has also become vice-president of the company and for the time being will hold both the post of vice-president and secretary. J. F. Kurfees, Sr., founder of the business, is chairman of the board, and J. F. Kurfees, Jr., is president.

Dow Plastics Division Reorganized

In the interest of expanded departmental operations, due to the development of many new plastic products, the following personnel changes in The Dow Chemical Company's plastics division were announced Aug. 1 by W. R. Dixon, assistant manager of Plastics Engineering, to be effective immediately.

At Midland, C. F. Cummins, formerly of the Chicago office, will have charge of plastic engineering activities in molding powders; R. J. Minbiole, formerly of the New York office, will handle packaging materials. P. W. Simmons was also transferred from the New York office to handle protective coating materials. F. J. Gunn, of the Midland staff, assumes the handling of plastic raw materials.

In the New York office, F. L. Brown will have charge of all plastics engineering activities for the Eastern territory. Gage Olcutt, recently with Bolta Company, will join the New York staff, assuming plastic engineering duties.

At Cleveland, E. R. Haines, formerly of the company's St. Louis office, will replace F. L. Brown.

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Johnson Appointed to Chemical Industries Staff

Howard C. E. Johnson, formerly an organic research chemist for the Rohm & Haas Company, has joined the staff of *Chemical Industries* as assistant editor. Dr. Johnson is a graduate of the University of Illinois and the University of Wisconsin. He received his doctorate from the latter institution which he attended on a Wisconsin Alumni Research Foundation Fellowship.

Koppers Names Wickersham to New Post

R. C. Wickersham had taken his new post of assistant general manager of the tar and chemical division in Pittsburgh of Koppers Company, J N. Forker, vice president of the company, has announced.

General Food Promotions Made

Dr. A. G. Olsen, manager of General Foods Corp. Central Laboratories, Hoboken, N. J., recently announced the promotion of three project leaders to head divisions at the Laboratories. Dr. R. T. Conner heads bioassay; Dr. Harrison E. Newlin, by-products utilization; and Dr. John H. Lutz, packaging research.

AICOA Sales Heads Appointed

Appointment of three assistant general sales managers to handle specific divisions of sales activities for the Aluminum Company of America has been announced by vice president George J. Stanley, general sales manager. The new assistant sales managers are R. V. Davies, R. B. McKee and Donovan Wilmot.

Mr. Davies will have charge of sales engineering and sales development activities. Mr. McKee will be in charge of district sales offices and all direct sell-

ing activities. Mr. Wilmot has been placed in charge of product manager activities and warehouse distribution.

Corn Products Personnel Changes Made

The following changes and additions to the staff of the Corn Products Refining Company have been announced by Dr. Albert L. Elder, director of research: A. N. McFarlane of the research department has been appointed associate director of research and Dr. S. M. Cantor, assistant director of research. Dr. William Earle Brinker, Jr., chairman of the chemical engineering department, Northwestern Technological Institute, joined the staff of Corn Products on July 17 as director of engineering, chemical division.

Dr. Gerald J. Cox, who recently joined Corn Products' research staff, left Mellon Institute in 1941 to join the War Production Board and then served as a consultant on dental caries for the National Research Council. Dr. Ward W. Pigman, specialist in carbohydrate chemistry and enzyme systems at the Bureau of Standards, Washington, D. C., joined the Corn Products' staff on July 12. Dr. Elizabeth M. Osman, formerly with Hercules Powder Company, and Dr. A. Richard Baldwin, formerly senior research fellow in biochemistry at the University of Pittsburgh, have also joined the staff.

Brown Joins Jones-Dabney

Fred A. Brown, for 20 years with the Grand Rapids Varnish Co., Grand Rapids, Mich., has joined the Jones-Dabney Co., a division of Devoe and Reynolds, in Louisville, Kentucky, as vice president and director of the wood finishes division.

Personnel Notes

JOHN T. BEGIEN, formerly research chemist with the Philip Carey Mfg. Co., is now Assistant General Manager of the General Magnesite and Magnesia Co., Philadelphia, Pa.

FRANK W. CLARKE recently resigned from the Distributing and Trading Co., N. Y.

H. P. FELL, formerly with the manufacturing division of The Borden Company, is now its production manager.

SHERWOOD B. SEELEY, formerly assistant director of research of the Joseph Dixon Crucible Co., was appointed director of the company's laboratories as of June 1.

EDWARD KOCH and GUSTAVE C. SCHLAG have been appointed plant manager and production manager, respectively, of the Alex. C. Ferguson Co., Philadelphia, Pa.

W. S. W. MCCARTER has been appointed director of research and development of the Attapulgus Clay Company and the Porocel Corporation, it has been announced.

P. VAL KOLB's appointment as director of the special markets division of Winthrop Chemical Company, Inc., has been announced by Dr. Theodore G. Klumpp, president.

DR. PAUL EDGAR WILLIAMS, director of Jefferson College, St. Louis, for the past 10 years, has joined Owens-Corning Fiberglas Corporation as director of the company's newly-expanded program.

O. W. BARLOW, Ph.D., M.D., has been appointed medical and research director of Nutrition Research Laboratories, Chicago, makers of ethical pharmaceutical products.

MELVILLE M. WILSON has been appointed sales manager of R-B-H Dispersions, Inc., O. D. Bluthardt, vice president of the company, has announced. Mr. Wilson was engaged four years ago in a technical and sales capacity by Interchemical Corporation, of which R-B-H is a subsidiary.

MAX VAN PELS has opened offices at 441 Lexington Avenue, N. Y., for the importation and exportation of drugs,

CYCLAMAL

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(*Lily of the Valley, Lilac, etc.*)

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As soon as WPB's new ruling, M-139, Direction 2, was issued, establishing phthalic anhydride maximums in alkyd resin vehicles used in certain government specifications, U.S.I. Chemicals developed and tested new resin vehicles meeting these new requirements.

A full line of alkyd resin vehicles for use in enamels, coatings and primers produced under each of these new specifications is now available.

Information on the application of these new U.S.I. alkyd resin vehicles in connection with the new specifications is given in RESINEWS Vol. XI, Issue 2, recently issued to the trade. Further data which may be required will be furnished gladly on request.

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"S & W" ESTER GUM — all types
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AROFENE — pure phenolics
AROCHEM — modified types
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U.S.I. CHEMICAL NEWS

August ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1944

New Modified Alkyd Offered by U.S.I. for Specification Paints

S&W Aroplaz 1375 Meets W.P.B. Phthalic Anhydride Restrictions

Announcement of a new ester gum-modified alkyd resin, for use in the specifications recently issued to meet current W.P.B. restrictions on phthalic anhydride, has been warmly received by formulators of protective coatings.

The new War Production Board directive, Order M-139, Direction No. 2. by further limiting the percentage of phthalic anhydride in the vehicle solids components of various specification coatings, has, in effect, made obsolete many government agency specifications. However, alternate specifications requiring resins of lower phthalic content have been issued; many of these, like those shown below, call for semi-alkyd resins, or alkyd resin-ester gum varnish blends.

U. S. I.'s new resin, S & W Aroplaz 1375, is a composite ester gum-modified alkyd specifically developed to meet these new specifications; it is now being used effectively as the total vehicle solid component in such specifications as these:

ARMY SPECIFICATIONS

3-171 Grade II, Primer, Synthetic, for Ferrous Metals

3-172A Grade II, Primer, Synthetic, Refinishing

3-173 Grade II, Enamel, Synthetic, Lustreless

3-174 Grade II, Enamel, Synthetic, Semi-Gloss

3-175A Grade II, Enamel, Synthetic, Gloss

NAVY SPECIFICATION

52-P-26 (Amend. of 6/1/44) Primer, Metal (Brown)

Polymerized to a high viscosity, S & W Aroplaz 1375, permits formulation of acceptable products containing maximum volatile content. This permits coating manufacturers to produce specification finishes at minimum raw material cost, with no sacrifice in quality.

Samples of the new resin and additional information on formulation can be obtained by writing to U. S. I.

Startling New Uses Loom for Today's "Miracle" Drugs

Broad Potentialities Seen in Recently Reported Cures with Penicillin, Atebrin, Sulfadiazine and Other Chemicals

With the discovery, in 1935, of the remarkable medicinal properties of the sulfonamides, chemotherapy came back into the limelight, renewing a march which has since turned into a veritable parade of new life-saving pharmaceuticals.

Official Photo U. S. Army Signal Corps

Military paints ranging all the way from stencil paints to the olive drab which marks the jeep the world over are being formulated with S&W resins. Of particular interest now is U. S. I.'s announcement of the new resin, Aroplaz 1375.

Glamorized as "miracle drugs" by the popular press, penicillin, atebrin, sulfadiazine, the vitamins, and other chemical compounds have won quick fame because an energetic chemical industry was able to push them into large-scale production almost overnight.

In less than a decade, production of sulfa drugs has leapt past the 10,000,000-pound mark. Atebrin, war-essential substitute for quinine, is now being produced at a rate which dwarfs previous world production of quinine. Vitamin production has skyrocketed into astronomical figures. And — when the full story can be told — the volume production of penicillin from a lowly mold will go down as one of the industry's big achievements.

New Cures with New Drugs

While volumes have been written about the capabilities of these new pharmaceuticals, one need only watch the current news to gain an idea of the unlimited horizons ahead. Penicillin, for example, finds a new use in the treatment of psittacosis, the deadly "parrot fever". Sulfadiazine is used to fight meningitis. Arthritis, widespread and stubbornly resistant to treatment, is now being successfully treated with penicillin.

In the field of food allergies, vitamin C is suggested as a cure. Pneumonia and empyema afford two further examples; formerly unaffected by penicillin, these diseases now yield to intrapleural injections. Even the irksome mosquito seems to be losing ground, large doses of vitamin B_1 being reported to immunize people against its bite.

U. S. I. Chemicals at Work

In the field of drug synthesis, U. S. I.'s ethyl acetoacetate is widely used in the preparation of such products as atebrin, vitamin B_1, sulfamerizine, antipyrine and amidopyrine. Diethyl oxalate is used in the manufacture of gamma-pyrones; ethyl sodium

(Continued on next page)

Penicillin Inactivator Facilitates Culture Study

Cultures taken from patients who have been receiving penicillin treatment can be materially improved by a new penicillin inactivator. The inactivator completely destroys the penicillin in the culture, thus permitting the culture to develop naturally.

Extracted from strains of *Staphyloccus-aureus*, the inactivator is obtained by precipitating 24-hour saline cultures with acetone. After one change of acetone and two of ether, the precipitate is dried, powdered and stored at room temperature.

From hospitals at home to front-line first-aid stations, U. S. I. Pure Alcohol stands guard against infection. Perhaps the oldest medical chemical, alcohol is still the most widely used.

Ether-Air Mixture Proves Best for Cold-Weather Diesel Starting

Recent research has shed new light on the question of whether high cetane fuel blends give better cold-weather starting than "boosters" introduced into the diesel engine's air stream. The findings, reported in the S.A.E. Journal, are overwhelmingly in favor of the latter method.

The most effective fuel blend tested was obtained by adding 25 per cent ethyl ether to the diesel fuel; this gave far better results than did blends using butyl or hexyl ethers. But even ethyl ether only brought the starting temperature down to —5 deg. F.

When ethyl ether was directly introduced into the air stream of diesels, however, they started at temperatures down to —40 deg. F. In addition, partial combustion occurred immediately, relieving the battery of the major part of the starting load. The research further indicates that fear of fire from this method, expressed by manufacturers of crankcase scavenging diesels, has little basis in fact.

ADVERTISEMENT—*This entire page is a paid advertisement.*

August ★ **U.S.I. CHEMICAL NEWS** ★ 1944

Alkyd Resins Employed in New Calking Compound

A permanently plastic, nonshrinking, nonhygroscopic calking material suitable for sealing joints on aircraft, fuel tanks, etc., is described in a recent patent. An unmodified sebacic acid alkyd resin is the base in which an inert filler, formed mainly from asbestos filler and ground mica, along with a small percentage of zinc chromate, are mixed.

Zein Acetate Produces Strong, Flexible Films

Protective coating films of zein acetate are claimed to be stronger, more flexible, and more water-resistant than films of zein itself or plasticized zein, according to a British patent on a process for making the acetate.

The acetate differs from zein in that it is insoluble in ethyl alcohol. But it is soluble in mixtures of 95% ethanol with butyl lactate or ethylene glycol monoethyl ether. The mixture should contain 50 to 80% ethanol.

In the description of the process, acetic anhydride, acetic acid, acetyl chloride, and ketene are mentioned as suitable acetylating agents. Sulphuric acid or anhydrous sodium acetate are employed as catalysts.

New High-Antiknock Fuel

A recently granted patent describes a high-antiknock motor fuel consisting essentially of isoparaffinic motor fuel hydrocarbons, such as those produced by the alkylation of isoparaffins. The hydrocarbons are of the type that may be produced by alkylating isoparaffins with normally gaseous olefins and an aliphathic ester of formic or acetic acid, such as butyl acetate.

New Alternate for Shellac in Rubber Preservatives

A new compound, designed to take the place of shellac in rubber preservation lacquers is claimed by a German article to be both non-cracking and non-scaling. Vinnapas, a polyvinyl compound, is dissolved in either alcohol, hexane, acetone, ethyl acetate or butyl acetate. Pigment and resin are then added to produce a high-gloss, strongly adhesive black paste.

New "Miracle" Drugs

(Continued from preceding page)

acetone oxalate in making acetopyruvic acid; acetone as a source of chloroform.

Ethyl acetate and ethyl formate are among the starting materials in the manufacture of sulfadiazine. Indalone, U. S. I.'s powerful new insectifuge, serves as a vital ingredient in the government's new insect repellent.

Alcohol, ether, acetone and other solvents are used on a large scale in all types of extractions. Particularly important is the use of amyl acetate in the extraction of penicillin. Vitamins, hormones, alkaloids, glucosides and other drugs are still extracted in large amounts from natural animal and vegetable sources; here U. S. I. solvents are vital tools in extraction and purification. In analytical work, indispensable to control of both production and administration of pharmaceuticals, the same solvents are constantly used.

End-Product Uses

U. S. I. products are found not only in intermediate stages of pharmaceutical manufacture, but also in end products. Ether and ethylene are used in anesthesia. Ethyl formate is used internally as a remedy for diarrhea, as an inhalant for respiratory affections, and externally as a rubefacient. Urethan is used as an anti-spasmotic for convulsions, restlessness, etc., and as an antidote for strychnine, resorcinol and picrotoxin poisoning. It is also used as a co-solvent to increase the solubility of quinine hydrochloride in water. Alcohol, ether, and acetone are used in the manufacture of pill coatings. Sulfonamide films useful for treating burns and surface wounds have been prepared by spraying 50% acetone or alcohol emulsions of the sulfa drug with methylcellulose, triethanolamine and sorbitol on a glass surface and allowing to dry.

Alcohol is perhaps the most widely used solvent in the medical profession. Its germicidal properties make it invaluable in sterilization. It is also widely used as a vehicle for medicines and as an ingredient in ointments, lotions, antiseptics, etc.

Nerve Block

Alcohol, too is finding increasing use as a pharmaceutical end-product in therapeutic nerve block. A recent application of this technique is in the treatment of blood vessel spasm, a disease of old-age, which is both painful and dangerous. Where the age of the patient makes surgery hazardous, 95% alcohol is injected around the sympathetic nerve, bringing immediate relief.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A new resin adhesive designed to bond copper or copper alloys together is announced. According to the maker, it also bonds copper to other metals or non-metallic structural materials when co-bonding agents are employed. **(No. 837)**

U S I

Continuous plastic sheeting, up to 54 inches in width, is now produced in thicknesses from .030 to .25 inches. The surface is described as workable and unaffected by contact with gasoline, oils, acids, most alkalis, alcohol. Suggested post-war uses include luggage, wall paneling, flooring, table tops, house furnishings. **(No. 838)**

U S I

A new artificial leather, reported to exceed natural leather in strength and weather resistance and to be mildewproof, is announced. **(No. 839)**

U S I

Availability of a humectant for civilian use is announced. Valuable for stabilizing the moisture content of foods, cosmetics, adhesives and a wide range of other materials, the product is a hexahydric alcohol said to possess extremely low volatility, neutral reaction, bland taste, and other desirable properties. **(No. 840)**

U S I

Permanent sealing of riveted fuselages, fuel tanks, gun turrets and acrylic structures against leakage caused by severe vibration is the war purpose of a new sealing tape. Tape is insoluble in common solvents, such as aromatic aviation fuel, ethyl and butyl acetate, and resists hardening from prolonged exposure to air. **(No. 841)**

U S I

A new cleaning compound, which comes as a self-emulsifying, non-phenolic liquid, is said to remove grease, oil, smut, and drawing and buffing compounds from metals and painted surfaces. Used as supplied for dipping, spraying, or brushing, or as a water emulsion in washing machines. **(No. 842)**

U S I

Loosening rust-frozen parts is said to be facilitated by a quick-acting new penetrant oil. The product is also said to dissolve gum, dried grease and oil, and to remove rust and carbon deposits. **(No. 843)**

U S I

To aid carton re-use, a new "carton colored", opaque ink is offered to obliterate old stencils. It is claimed that the new ink completely covers the old markings and dries almost instantly after application by brush. **(No. 844)**

U S I

New rust preventive oils are offered in 14 grades. According to the manufacturer, the oils form protective coatings ranging from thin, transparent films to heavy, abrasion-resistant coatings of the water-proof variety. **(No. 845)**

U S I

To scent floor waxes, furniture oils, window cleaning fluids, insecticides and kindred products, a new, low-cost odorant is offered, with what is described as a powerful, clean, lemon-pine odor. **(No. 846)**

U S I

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Amyl Alcohol
Butanol (Normal Butyl Alcohol)
Fusel Oil—Refined
Ethanol (Ethyl Alcohol)
Specially Denatured—all regular and anhydrous formulas
Completely Denatured—all regular and anhydrous formulas
Pure—190 proof, C.P. 96%, Absolute
*Super Pyro Anti-freeze
*Solox Proprietary Solvents

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Butyl Acetate
Ethyl Acetate

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Dibutyl Oxalate
Diethyl Oxalate

PHTHALIC ESTERS
Diamyl Phthalate
Dibutyl Phthalate
Diethyl Phthalate

OTHER ESTERS
*Diatol
Diethyl Carbonate
Ethyl Chloroformate
Ethyl Formate

INTERMEDIATES
Acetoacetanilide
Acetoacet-ortho-anisidide
Acetoacet-ortho-chloranilide
Acetoacet-ortho-toluidide
Acetoacet-para-chloranilide
Ethyl Acetoacetate
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ETHERS
Ethyl Ether
Ethyl Ether Absolute A.C.S.

FEED CONCENTRATES
*Curbay B-G
*Curbay Special Liquid
*Vacatone 40

ACETONE
Chemically Pure

RESINS
S&W Ester Gums
S&W Congo Gums—raw, fused & esterified
S&W *Aroplaz—modified and allied materials
S&W *Arofene—pure phenolics
S&W *Arochem—modified types
S&W Natural Resins—all standard grades

OTHER PRODUCTS
Collodions
Ethylene Glycol
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GLYCERYL MONOSTEARATE

Self-emulsifying and non-emulsifying

Glyco manufactures two grades of Glyceryl Monostearate—Glyceryl Monostearate S, the self-emulsifying grade, and Monostearin, the non-emulsifying grade.

Uses of GLYCERYL MONOSTEARATE S

Edible and Pharmaceutical Emulsions

Cosmetics for the manufacture of greaseless creams.

Protective Coatings for Edible Hygroscopic powders, crystals, tablets. These are sprayed with Glyceryl Monostearate S in hot alcohol and other suitable solvents; then tumbled in a heated barrel until all the solvent has evaporated. The finished product is coated with a thin protective film which disperses when the product is thrown into water.

Shortenings, Cooking Oils, Fats. Small quantities added to shortenings and similar products improve the smoothness and whiteness of the finished material.

Uses of MONOSTEARIN

Shortenings, Cooking Oils, Fats. This product also improves the smoothness and color of these materials and enables the incorporation of a small percentage of water.

Synthetic Waxes—for waterproofing, insulation, polishes, dental waxes, etc.

Enteric Coating for Tablets—replaces shellac and is insoluble in water but readily dispersible in alkali.

Emulsifying Agent—as an edible water-in-oil emulsifying agent.

Pour Point Depressant—for vegetable oils, shortenings, and certain lubricating oils.

• BOTH GLYCERYL MONOSTEARATE S and MONOSTEARIN can be used for edible purposes

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(Collodial Mercury Linoleate—Patent No. 2,269,743)

A TESTED . . . PROVED SOLUTION that:

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This Solution has active properties to make soap, ointment, protective cream, lotion and other products actively and powerfully ANTISEPTIC and GERMICIDAL. Relatively non-toxic.

Mer-Lin has been thoroughly tested and approved as a reliable preventative of Mildew-Rotting in cotton, rayon, wool and other textiles.

You are invited to consult with our technicians to determine how Mer-Lin may be incorporated into your product to give it Antiseptic and Germicidal properties. Low in cost . . . NOW available in quantity . . . priority free! If you prefer, we will be glad to send you a FREE Sample of Mer-Lin TODAY. This is an exclusive product of:

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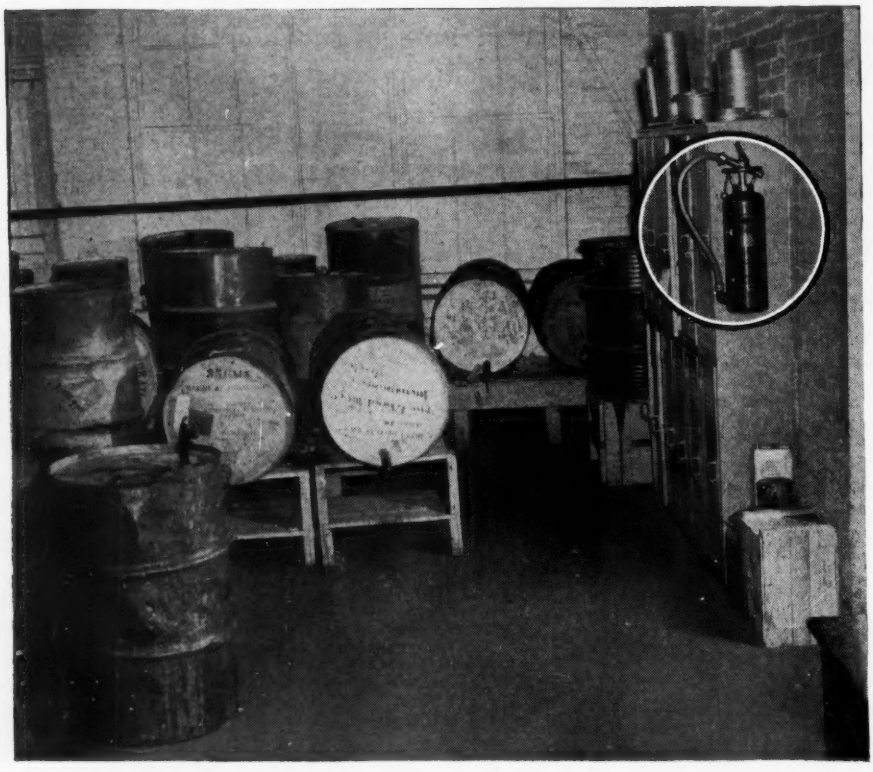

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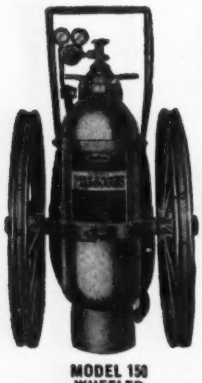
This is just another spot where DUGAS Fire Extinguishers are on the job. Ready for action!

Applied from the DUGAS pressure-type extinguishers, PLUS-FIFTY DUGAS Dry Chemical makes short work of dangerous flammable liquid or gas fires. Knocks them out with tremendous speed!

Less hazardous for the operator, too, because PLUS-FIFTY DUGAS Dry Chemical does its work from safe distances. Non-toxic, non-corrosive, it hurts nothing except fire.

Write for complete information regarding DUGAS PLUS-FIFTY Dry Chemical—and for priority facts about DUGAS Fire Extinguishing Equipment.



MODEL 150 WHEELED EXTINGUISHER

Approved by Underwriters' Laboratories and Factory Mutual Laboratories.

CHART showing characteristics of all types of approved hand fire extinguishers sent free on request.

MODEL 30-T HAND EXTINGUISHER

DCM-2-44

DUGAS ENGINEERING CORPORATION, MARINETTE, WISCONSIN

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chemicals, botanicals, gums, etc. Mr. Van Pels was formerly associated with the New York office of Stauffer Chemical Company.

Lawrence B. Steele, Jr., research chemist in the Acetate Research Section of the Du Pont Company, at Waynesboro, Virginia, has been named research supervisor in the same section. He will supervise work on problems related to high-tenacity rayon yarn.

Wendell E. Bacon, formerly of the U. S. Rubber Co., of Passaic, N. J., has been appointed eastern representative of the C. P. Hall Co., Akron, Ohio.

Dr. L. W. Covert, previously assistant to the president, has been elected vice president and director of the Chas. Lennig and Co., Inc., Philadelphia, Pa.

Woburn Chemical Appoints Ransom

James Dudley Ransom has been appointed sales manager of the chemical division of the Woburn Chemical Corp., N. J., it has been announced by A. G. Reimold, president of the company.

Fred Gronmeyer, previously plant manager of the plastics division of Monsanto Chemical Co., in Springfield, Mass., has been promoted to assistant director of the general engineering department.

Walter P. Konrad was promoted to branch manager of the phosphate division sales department of the Monsanto Chem. Co., in Chicago, from the phosphate sales department in St. Louis.

Lyle M. Geiger has been appointed director of research and Harry Shearer, superintendent, of the Neville Company, Pittsburgh, Pa.

Ben W. Lewis has been appointed chairman of the Patent Contracts Committee in the Office of the Alien Property Custodian, James E. Markham, Alien Property Custodian, has announced.

Capt. J. B. Willis, after nearly four years with the services in the States, in New Guinea, and Australia, returns to the technical laboratories of the Pemco Corporation in Baltimore, Md.

Dr. G. F. D'Alelio was made vice president of the Pro-phy-lac-tic Brush

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THE *Improved* AUTOMATIC SCALE

The new "ACROMATIC" is a heavy duty, automatic scale for check weighing, mixing, batching and bagging under continuous, high speed production. It handles up to 8 weighings per minute depending on size of charge and nature of material.

The "ACROMATIC" handles any lumpy, granular or powdery substance. Ordinarily supplied with a gravity feed, it can be equipped with power feed for non-free-flowing material. All weighings are recorded by counter located in an easy-to-read position. Checking device permits testing accuracy of scale at any time during operations.

Frame is of all-welded steel plate construction forming a dust-proof housing. Pivot points are fully protected from dust and dirt. Write for complete information.

CONSOLIDATED PACKAGING MACHINERY CORP.
BUFFALO, N.Y.

Co. Since March, 1943, he has been director of chemical research, a position he will continue to hold.

RUSSELL H. DUNHAM has resigned as chairman of the board of directors of Hercules Powder Company, it was announced following the monthly board of directors' meeting of the company. He will remain as director and chairman of the finance committee.

DR. RALPH L. DODGE has been appointed control manager of the Ammonia Department of E. I. du Pont de Nemours & Company, it was announced. He succeeds Samuel J. Thomison who has been granted a leave of absence pending his retirement September 1 after forty years of service with the company.

H. O. TEEPLE, chemical engineer, has joined the Technical Service Group of the Development and Research Division of The International Nickel Co., Inc., at New York, T. H. Wickenden, Manager of the Division, announces. He will specialize in corrosion problems.

J. JACOBS was promoted recently to the position of plant superintendent of the Bell Company, Inc., Chicago, Ill.

R. I. BASHFORD, who was general manager of the Kentucky Ordnance Works of the Atlas Powder Co., has been appointed General Manager of the Ravenna Ordnance Center of that company.

INDUSTRIAL TRENDS

The following industrial activity was reported for the week of July 28:

Steel: Tonnage was down fractionally from 1,731,800 to 1,717,800 tons, a capacity drop from 97.2 to 95.5 per cent.

Electric Power: Output rose from 4,377,152,000 to 4,380,930,000 k.w.h.

Crude Oil: Daily production increased from 4,602,350 to 4,615,450 barrels.

Bituminous Coal: Output dropped from 12,260,000 to 11,980,000 tons.

The Dun and Bradstreet wholesale price list index of 30 basic commodities stood at 171.82 in comparison to 171.80 of the week of July 21.

Stauffer Named Du Pont Group Leader

William O. Stauffer, who for the past several years has been research superintendent, ammunition section of Remington Arms Co., Inc. technical division at Bridgeport, Conn., has been named senior group leader, Electro Chemical Department, E. I. du Pont de Nemours & Co.

OBITUARIES

DR. FRANK J. TONE, 75 years old, chairman of the board of the Carborundum Company, died July 26 at his home after a long illness. Dr. Tone, famed for his experiments with abrasives, retired as president of the company on April 22, 1942, when he became chairman of the board and acted in an advisory capacity.

ROBERT MULLIGAN, president and treasurer of the J. U. Starkweather Co., chemical distributors, died July 9.

EUGENE C. SCHWARZENBEK, former manager of the Newark district office of the Electrochemicals Department of the Du Pont Company, died Sunday night, July 23, at his home, 70 North Road, Nutley, N. J. Mr. Schwarzenbek retired from his position December 31, 1942, because of ill health.

GEORGE A. GAHLES, assistant control manager of the Grasselli Chemicals Department, E. I. du Pont de Nemours & Company, died July 23 of a heart attack while vacationing at his home town of Beaver Falls, Pa.

Mr. Gahles had a record of 45 years service with the du Pont Company and the Grasselli Chemical Company.

FRANCIS PATRICK GORMELY, president of Electro Metallurgical Co., Haynes Stellite Co., Michigan Northern Power Co. and several other units of Union Carbide & Carbon Corporation, died at his home in New Rochelle July 13 after a short illness. He was 56 years of age.

THE R. J. PRENTISS & CO., INC. WORLD IN BOTANICALS

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WAR REGULATIONS SUMMARY

ALIPHATIC ALCOHOLS—Allocation control transferred from Order M-344 to Order M-300. Oleyl alcohol was added to the schedule at the time of the change.

ALKYD RESINS—A monthly emergency allotment of alkyd resins to be used in filling emergency orders for the military end uses that have been approved during the preceding two calendar months on Form WPB-2945 now replaces interim applications for such materials. The usual interim application will still be necessary in the case of end uses that have not been approved on Form WPB-2945 during the preceding two months. Single shipments made under the emergency allotment plan are limited to a maximum of 500 lbs. of solid phthalic alkyd resin content. Direction No. 3 to Order M-139.

ALKYL AMINES — Monomethylamine and dimethylamine will be placed under quarterly allocation under General Allocation Order M-300, effective October 1. Small order exemption is 1,000 lbs. of each material per person per quarter.

CARBON BLACK—WPB has revoked Order M-244, transferring allocation control of furnace type carbon black to Order M-300 and extending the controlled list to include the rubber grades of channel type carbon black.

CHEMICALS—An amended version of appendices A, B, and C to Order M-300, the general allocation order for chemicals and allied products, is now available from WPB Chemicals Bureau. The appendices contain an outline of allocation requirements of all materials controlled by Order M-300, and are designed to be used as a reference.

COAL-TAR CRUDES — Benzol, toluol, xylol, as by-products of coal carbonization and in carbureted water-gas and oil-gas, formerly exempt from price control when sold for use in production of aviation gasoline, have been placed under price control at March 1942 levels. This followed a report by Defense Supplies Corporation and the Rubber Reserve Company that they were paying no higher prices in any event, than those on commercial sales. The change does not apply to these products when made from petroleum, nor to sales of benzol by Defense Supplies.

COTTON LINTERS—To meet increased military requirements for smokeless powder and high tenacity rayon tire cord, producers of cotton linters are required as of August 1 to set aside 80 per cent of their output that is acceptable for chemical use for delivery to the Commodity Credit Corporation. This requirement is contained in Direction 1 to WPB Order M-12, governing cotton linters and hull fibre.

DIPHENYLAMINE—Placed under General Allocation Order M-300, revoking Order M-75.

FERROCYANIDES—Certain ferrocyanides and ferricyanides will be placed under allocation effective September 1 by an amendment to General Allocation Order M-300. The compounds affected, along with their small order exemptions per person per month, are: sodium ferrocyanide, 720 lbs.; potassium ferrocyanide, 100 lbs.; potassium ferricyanide, 100 lbs.; potassium-sodium ferricyanide, 370 lbs.

FERTILIZERS—A nationwide simplified retail schedule of uniform dollar and cents ceiling prices on mixed fertilizers, superphosphates, potash, and nitrogenous materials was put into effect August 1 by OPA. The new prices are included in a revised regulation on fertilizers (Second Revised Maximum Price Regulation No. 135) which clarifies the technical lan-

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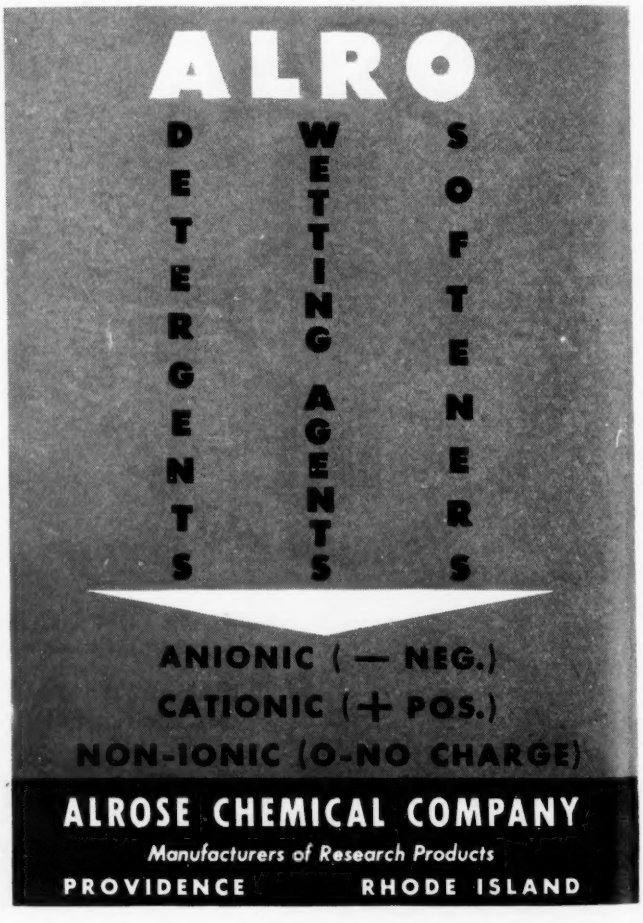

Carbase Emulsifier

An outstanding emulsifying base and oil soluble wetting agent. Non-odorous, dark amber, viscous liquid, impervious to oxidation and practically neutral. Stable in pH range of 3.7 to 12. Soluble in most common solvents, hydro-carbons and water. Used for emulsification of synthetic resins, i.e., polyvinyl acetate; acrylates, alkyds, etc. Also emulsification of mineral oils, hydrocarbons and the dispersion of water in solvents.

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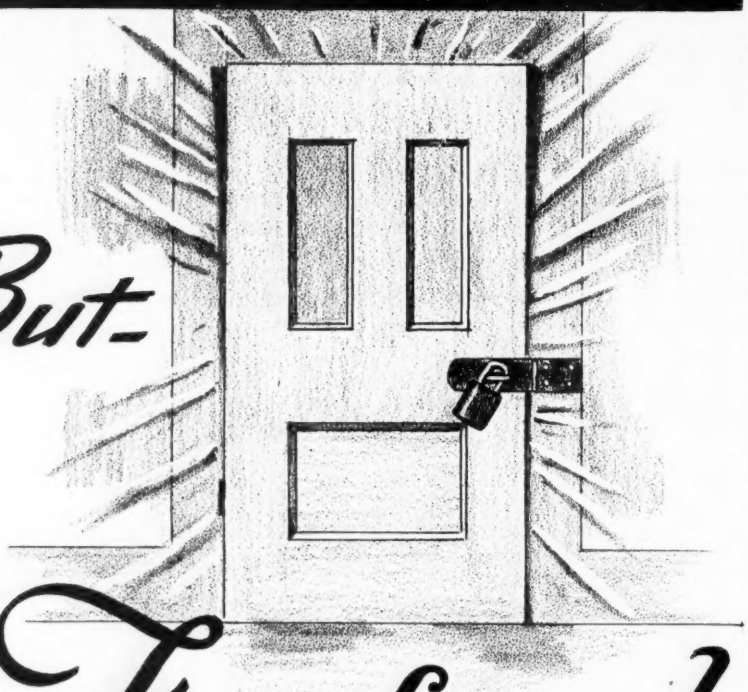

But— Furfural

will again be back in the not too distant future. Production is keeping up with demand and there is reason to believe that it will continue to do so. Now is a good time to make plans for its use.

Uses for Furfural are many. It is a liquid aldehyde, amber to brown in color, with a comparatively low vapor pressure at room temperature. It is miscible with alcohol, acetone, benzol, ether, and most organic solvents, with the exceptions of petroleum hydrocarbons and glycerol. It is a dispersant for cellulosic derivatives such as nitrocellulose and cellulose acetate and many types of synthetic resins, particularly phenolics.

Considerable information is available regarding many of the applications of Furfural and its associated Furan chemicals. If you have not investigated the possibilities of using it, it may pay you to do so today.

The Furans

FURFURAL

FURFURYL ALCOHOL

TETRAHYDROFURFURYL ALCOHOL

HYDROFURAMIDE

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TYPICAL PROPERTIES

Specific gravity (20/20)	1.161
Freezing point	—37° C.
Boiling range	157–167° C. (99%)
Flash point (open cup)	56° C.
Refractive index (20/D)	1.5261

The Quaker Oats Company

TECHNICAL DIVISION 3-8

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FURFURAL - FURFURYL ALCOHOL - HYDROFURAMIDE
... TETRAHYDROFURFURYL ALCOHOL ...

guage of the previous regulation and incorporates the pricing of nitrogenous material previously under another regulation (Revised Maximum Price Regulation No. 108). The new schedule raises prices in some sections of the country and lowers them in others.

GLYCOL ETHERS—Allocation control of these products has been transferred from Order M-336 to Order M-300, effective August 1. Small order exemptions are increased as follows: monobutyl ether of ethylene glycol, raised from 400 to 4,000 lbs.; monomethyl ether of ethylene glycol, from 430 to 2,150 lbs.; monoethyl ether of ethylene glycol, from 410 to 4,100 lbs.; and monoethyl ether of diethylene glycol, from 460 to 2,300 lbs.

MRO SUPPLIES—Under a new revision of P-89, the order which assigns ratings for MRO materials for the chemical industry, producers of chemicals and allied products may place orders for supplies costing up to 120 per cent of the cost of similar purchases during 1943.

MELAMINE ALDEHYDE—Allocation control transferred from Order M-331 to Order M-300, Schedule 35. Small order exemption raised from 1,000 to 10,000 lbs. for the resin and from 100 to 2,000 lbs. for the molding compound.

NAPHTHALENE—Placed under General Allocation Order M-300, revoking Order M-105.

PINE OIL—To obtain additional pine oil for use as a disinfectant in wash rooms and toilets of schools and hospitals, manufacturers and distributors are advised to state on allocation applications the name of the institution and the quantities needed in each case. Where such information is given, pine oil will be allocated to such an extent as is permitted by available supplies, according to WPB.

ROTENONE—Imports for 1945 are expected to be slightly in excess of those received for the preceding year, according to WPB Chemicals Bureau.

ULTRAMARINE BLUE—Placed under allocation under WPB Order M-300, effective August 1. Small order exemptions, 25 lbs. per person per month.

UREA—Allocation control transferred from Order M-331 to Order M-300, Schedule 34. Small order exemption raised from 1,000 to 10,000 lbs. for the resin and from 100 to 2,000 lbs. for the molding compound.

Correction

In the article "A New Dry Process for Making Chlorine Dioxide" which appeared in the July issue, the reference to potassium *chloride* as an early source of chlorine dioxide should have been potassium *chlorate*. Also, in the same article, the generator tower is lined with stoneware or *glass*, not *glue*.

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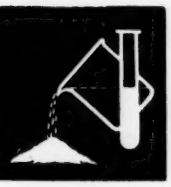

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CHEMICAL SPECIALTIES NEWS

Dow Extends Fumigant Facilities

Present demands for the preservation of increased quantities of foodstuffs being shipped and stored for Army, Navy and lend-lease use has made it necessary to extend technical and distribution facilities of their fumigant division to cover the Eastern territory, the Dow Chemical Co. has announced.

George F. Kerbey was appointed to head this branch of the business in the East, with headquarters in the company's Philadelphia office. Mr. Kerbey was formerly associated with the United States Department of Agriculture. He will act in an advisory capacity on various fumigant techniques, serving the armed forces, food processors, food handlers and warehousemen in the Eastern territory.

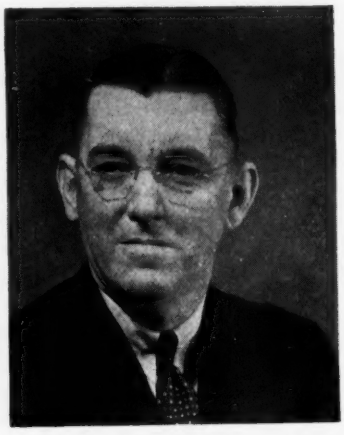
Chlorine Dioxide Offered For Industrial Use

Chlorine dioxide, a bleach said to be two and one-half times as powerful as chlorine, is now available for industrial purposes, including use in bleaching soap, by means of a process developed by Mathieson Alkali Works. The use of chlorine dioxide has been limited because it does not keep, and therefore cannot be manufactured in bulk for shipment. The new process overcomes this difficulty by providing a safe, practical method by which the user prepares the bleach from chlorine and sodium chlorite at the point of use and in the quantity required.

Fungicide, Mildew-Proofing Agency

2, 3-Dichloro-1.4-naphthoquinone has been found effective in the control of 22

Cowles Appoints Territorial Heads



The Cowles Detergent Company, Cleveland, Ohio announces the appointments of Charles W. Churchill, left, as Cowles Technical Engineer for Northeastern Ohio and Western Pennsylvania territory and of Cylde E. Lowe, right, of Lakewood, Ohio for covering Cleveland and Northwestern Ohio.

GUMS

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Hercules Powder New Insecticide Laboratory

Hercules Powder Company's modern air-conditioned insectary in the laboratory recently placed in operation at Brunswick, Ga., for the biological and chemical testing of Thanite. Developed by Hercules chemists through research on turpentine and pine oil, Thanite has established itself as a toxic agent of prime importance to the manufacturers of household sprays and livestock sprays. In a degree it is largely responsible for meeting a critical shortage of raw materials for insecticides.

important and widely divergent fungi. This organic fungicide appears to be non-injurious to foliage and may prove effective as a plant spray. As a mildew-proofing agent, the material protected cotton fabrics in laboratory and soil-burial tests. It appeared to have no harmful effect on the fabric as determined by bursting strength measurements and should prove valuable in replacing compounds containing such strategic chemicals and copper and mercury.

New Wool Dyes Marketed

A new line of wool dyes in the metachrome range, to be distributed under the name of Calcomet, is announced by the Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. The new line, which is complete and which was developed after extended laboratory work and mill testing, is said to combine the advantages of top chrome, metachrome and bottom chrome processes.

New Synthetic Detergent Offered

A new synthetic detergent developed specifically for use as an ingredient in salt water and all-purpose soaps supplied

THREE ELEPHANT
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THREE ELEPHANT BORAX
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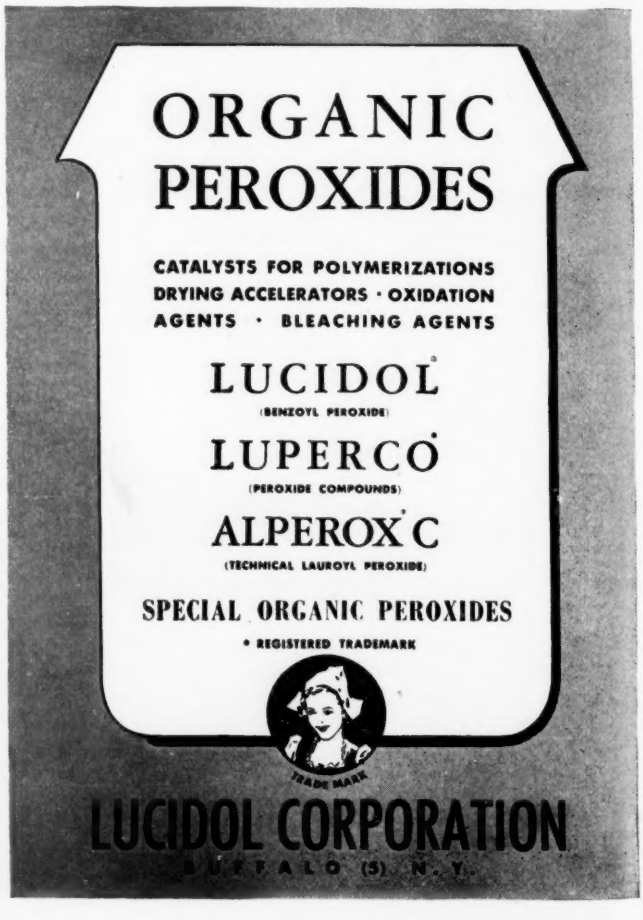

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Pioneers of Skin Protection in Industry

to the Armed Forces has recently been announced by E. I. du Pont de Nemours & Co. It is said to be of the class consisting of sodium salts of sulfonic acid derivatives of aliphatic and alicyclic hydrocarbons. Mixed with other normal soap constituents in a proportion of about one to two, it is said to give an all-purpose detergent that will remove dirt, oil and grease in any kind of water, salt or fresh, cold or hot, hard or soft.

Cuprodine For Copper Coating Steel

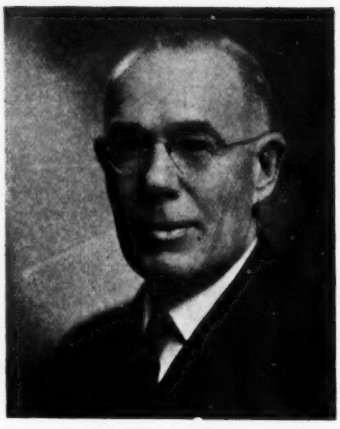
A practical method of copper coating steel and iron surfaces without electroplating involves the use of "Cuprodine," a product of the American Chemical Paint Co., Ambler, Penna. Of the several possible reasons for applying a thin adherent copper coating to steel and iron products, one of the most important during the war effort is to utilize the copper coating as a "drawing medium" to facilitate the drawing (forming) of sheet steel cartridge cases.

Test data available at the present time indicate that it has increased die life from five to ten times that obtained without its use.

Calco Chemical Purchases Virginia Plant

The Calco Chemical Division, American Cyanamid Company, has announced the acquisition of the Titanium Dioxide Manufacturing Facilities of the Virginia Chemical Corporation in Piney River, Virginia, from the Interchemical Corporation. This organization, formerly a part of the United Color and Pigment—Interchemical set-up, now becomes a unit of the pigment department of the Calco Chemical Division with J. Allegaert as manager.

Sanderson Heads Boyle-Midway



Harold E. Sanderson has been elected president and general manager of Boyle-Midway (Canada) Limited, it was announced. Chief products of the company are Old Englishe waxes and polishes, 3-In-One Oil, and Flyded, Black Flag and Antrol insecticides.

Chemical Specialty Data Files Available

A new series of eight technical data files prepared by Dr. Erich Meyer, director of the department of industrial research, L. Sonneborn Sons, Inc., New York, provides useful information on various petroleum products for manufacturers of household sprays, cattle sprays, corn earworm oils, protective creams for industry, brushless shaving creams and other specialties.

The products for which data is supplied in these technical data files are also used in the manufacture of household type insecticides, automobile and furniture emulsion polishes, solvent cleaners of industrial floors, trucks and buses, summer spray emulsions for the protection of orchard crops, and animal remedies.

Copies may be obtained, without charge, by writing to the Department of Industrial Research, L. Sonneborn Sons, Inc., 88 Lexington Avenue, New York 16, N. Y., specifying the type or types of manufactured product for which data is desired.

Conti Products Buys Draper Soap

Conti Products Corp., Brooklyn, have just announced the purchase of Draper Soap Co., Pawtucket, R. I., which Conti will operate as a division.

GUMS

TRAGACANTH KARAYA ARABIC
QUINCE SEED NUTGALLS

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Low ratio of dead weight to transport payload.
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Difficulties Beset Petroleum Gas Market

The rate of expansion in sales of liquefied petroleum gases showed a further shrinkage in 1943 when deliveries of 675,233,000 gallons were only 15 percent above the 1942 total of 585,440,000, compared with increases of 27 percent in 1942 and 48 percent in 1941, according to a survey made by the Bureau of Mines, United States Department of the Interior. Adverse market factors, evident in 1941 and 1942, such as inadequate transportation, shortage of equipment for handling and use, and diversion of increasing quantities for consumption as raw material principally for the manufacture of rubber and high octane motor fuel, were further intensified in 1943 and prevented distributors from supplying the potential demand in full.

The respective percentage increases for the principal uses of liquefied petroleum gases varied widely in 1943 compared with 1942. Sales of liquefied petroleum gases for industrial fuel showed a greater percentage gain in 1943 than in 1942, while increases for other uses in 1943 (except the minor "all other uses") were below the 1942 rate. Deliveries of liquefied petroleum gases to industrial plants increased by 31 percent in 1943 (149,429,000 gallons in 1943 compared with 114,132,000 in 1942) or double the 16 percent gain reported for 1942. The volume of liquefied petroleum gases credited to gas-manufacturing companies of 37,519,000 gallons in 1943 was 20 percent above the 1942 total of 31,366,000 gallons—an increment which compares with a 24-percent expansion in 1942. The annual growth in sales of liquefied petroleum gases for domestic use has contracted sharply from a 65-percent gain in 1941 to 36 percent in 1942 and to only 13 percent in 1943—owing to supply, equipment, and transportation difficulties. Reported deliveries of liquefied petroleum gases for domestic fuel were 339,380,000 gallons in 1943 against 299,559,000 in 1942. Limited supplies and restrictions in some areas are reflected in the smaller increase in use of liquefied petroleum gases as fuel for internal-combustion engines—87,834,000 gallons in 1943 compared with 82,456,000 in 1942—a gain of 7 percent in contrast to a 23 percent expansion in 1942 over 1941. Purchases of liquefied petroleum gases for raw material by chemical plants of 55,356,000 gallons in 1943 were only 4 percent above 1942 requirements and compare with a 20-percent gain in this particular demand recorded for 1942.

The percentage shares of the different gases making up total sales of liquefied petroleum gases changed somewhat in 1943 compared with 1942. Liquefied gases reported as butane dropped from 22 percent of the total in 1942 to 21 percent in 1943, as relatively more butane was diverted for raw material to manufacturers of motor fuel and rubber. The propane item for 1943 increased to 32 percent of total sales compared with 26 percent in 1942, a gain reflecting a shift from butane and butane-propane mixtures to propane as an industrial fuel. The rise in the propane proportion of total sales of liquefied petroleum gases was counterbalanced by a similar percentage loss for butane-propane mixtures, as "mixtures" dropped from 52 percent of 1942 deliveries to 46 percent in 1943. Pentane made up less than 1 percent of the 1943 total or about the same proportion as in recent years.

Demand for Butane

The rising demand for butane for use as raw material is indicated in the declining rate of increase in sales for fuel purposes. Deliveries of butane in 1943 of 140,122,000 gallons were 9 percent above the 1942 total of 128,560,000—a gain compared with increments of 15 percent in 1942 and 46 percent in 1941. Equipment for handling butane was not restricted to industrial and chemical plants and established gas-manufacturing companies, and consequently sales of butane to such establishments showed a gain in 1943 over 1942. Domestic users could not obtain new equipment for the consumption of butane, and its diversion for use as motor fuel was greatly restricted, so deliveries of butane under these two headings showed declines in 1943. Gas companies, using butane as "stand-by" gas, purchased 21,829,000 gallons of butane in 1943, a 76-percent gain over the 1942 quantity of 12,419,000 gallons. It is believed that a part of this rise in the use of butane reflects the effort on the behalf of gas companies to supply communities expanding under war conditions. The use of butane as industrial fuel, which accounts for about 40 percent of the total, increased by 11 percent from 50,495,000 gallons in 1942 to 56,143,000 in 1943. Chemical plants do not use relatively large quantities of butane as raw material; however, their purchases of 7,972,000 gallons in 1943 were 52 percent above the 1942 total. The use of butane as motor fuel has declined from 18,799,000 gallons in 1941 to 14,870,000 in 1942 and to 9,895,000 in 1943.

A shift to propane for fuel purposes in order to release butane for raw material is evident in a 45 percent increase propane sales in 1943—218,273,000 gallons in 1943 and 150,511,000 in 1942—compared with a 19-percent expansion in 1942 over 1941. The totals for all principal uses of propane were larger in 1943 than in 1942, except purchases by chemical companies, which declined. Propane is still predominately a domestic fuel; however, the proportion of total deliveries reported for domestic use has dropped from 77 percent of the total in 1941 to 75 percent in 1942 and down to 57 percent in 1943. The declining rate of growth in the use of propane for domestic purposes under adverse war conditions is indicated in another way—namely, the smaller percentage gains in sales in recent years, 42 percent in 1941, 16 percent in 1942, and 10 percent in 1943. Gas companies do not buy relatively large quantities of propane; however, their purchases increased from 4,957,000 gallons in 1942 to 8,117,000 in 1943—a 64-percent gain in contrast with a 26-percent decline in 1942 compared with 1941 requirements. Propane used as an industrial fuel increased by nearly three-fold in 1943 as manufacturers turned to this more available gas in place of butane. Deliveries of propane to industrial plants of 73,698,000 gallons in 1943 were 258 percent above the 1942 total of 20,601,000 gallons. Furthermore the volume of propane reported sold as industrial fuel was above the butane total for the first time in 1943. The quantity of propane used as raw material by chemical plants is not currently important, and the total declined to 4,455,000 gallons in 1943 compared with 5,850,000 gallons in 1942. Increasing sales of propane for internal-combustion-engine fuel have been reported in recent years as the supply of butane has been shifted to other uses. Propane credited as motor fuel has expanded from 1,631,000 gallons in 1941 to 3,112,000 in 1942 and to 4,592,000 in 1943.

Sales of butane-propane mixtures of 312,683,000 gallons in 1943 were only slightly above the 1942 total of 301,917,000 gallons. The annual percentage expansion in butane-propane deliveries, simi-

larly as with butane, has diminished noticeably in recent years — shrinking from a gain of 78 percent in 1941 over 1940 to a gain of 38 percent in 1942 and down to an increment of only 4 percent in 1943. Sales of butane-mixtures for domestic use increased by 21 percent from 140,516,000 gallons in 1942 to 169,818,000 in 1943. Butane-propane mixtures, like propane, are predominantly a domestic fuel; however, the proportion of the total reported for domestic use in expanding for "mixtures", whereas for propane relatively lesser quantities of the total are going for household consumption. Forty percent of the butane-propane mixtures was delivered for domestic fuel in 1941, 47 percent in 1942, and 54 percent in 1943. Gas-manufacturing companies bought substantially more butane and propane in 1943 but less of the "mixtures", the quantity of the latter declining by 46 percent from 13, 961,000 gallons in 1942 to 7,532,000 in 1943. The strong industrial turn to propane for fuel under present conditions is the opposite from the pronounced drop in deliveries of butane-propane mixtures for this purpose, the quantity shrinking by 55 percent from 43,011,000 gallons in 1942 to 19,474,000 in 1943. Large amounts of butane-propane mixtures are used as raw material by chemical plants; however, their requirements have remained fairly constant for several years—39,243,000 gallons in 1941, 38,325,000 in 1942, and 39,584,000 in 1943. As supplies of butane have tightened because of diversions to other channels, the use of butane-propane mixtures for internal-combustion-engine fuel has mounted steadily—the 1943 total of 73,344,000 gallons is 14 percent above the 1942 demand of 64,470,000 gallons.

Sales of pentane, which are relatively unimportant in volume, declined by 7 percent from 4,452,000 gallons in 1942 to 4,155,000 in 1943. Most of the pentane is delivered to chemical plants for use as raw material—the quantity declining from 3,607,000 gallons in 1942 to 3,345,000 in 1943. Some pentane is consumed as domestic fuel; however, the total has diminished from 1,128,000 gallons in 1941 to 766,000 in 1942 and to 637,000 in 1943.

Unusual factors under the stress of war conditions have forced some changes in the proportions of the different gases sold for principal uses. Butane which made up about 16 percent of the domestic demand item in 1940 has gradually decreased to 13 per cent share of the total in 1943. Propane as a domestic fuel has been replaced by butane-propane mixtures to some extent. Propane delivered as domestic fuel, making up over 50 percent of the total demand in 1940 constituted only 37 percent of the domestic-use item in 1943, while "mixtures" have expanded from one-third of the domestic total in 1940 to one-half in 1943. Purchases of butane by gas companies dropped from 54 percent of their requirements in 1940

Chemicals: United States Production, Consumption, and Stocks, May, 1944

Chemical and Basis	Units	May (Preliminary)			April		
		Production	Consumption in producing plants	Stocks at producing plants, end of month	Production	Consumption in producing plants	Stocks at producing plants, end of month
Synthetic anhydrous ammonia (100% NH_3)	Short tons	42,308	32,107	3,766	43,191	36,982	2,834
Bleaching powder (35%-37% avail. Cl_2)	M pounds	5,747	1,301	1,138	5,343	1,498	1,487
Calcium acetate (80% $Ca(C_2H_3O_2)_2$)	M pounds	1,083	(3)	294	775	(3)	358
Calcium arsenate (100% $Ca_3(AsO_4)_2$)[2]	M pounds	4,890	(3)	7,709	4,099	(3)	8,530
Calcium carbide (100% CaC_2)[2]	Short tons	(1)	(4)	(1)	(1)	(4)	(1)
Calcium hypochlorite (true) (70% avail. Cl_2)	M pounds	1,261	(3)	424	1,241	(3)	605
Calcium phosphate—monobasic (100% $CaH_4(PO_4)_2$	M pounds	4,270	(3)	5,669	3,882	(3)	5,558
Carbon dioxide:							
Liquid and gas (100% CO_2)	M pounds	(1)	(1)	(1)	(1)	(1)	(1)
Solid (dry ice) (100% CO_2)	M pounds	(1)	(1)	(1)	(1)	(1)	(1)
Chlorine	Short tons	109,327	61,484	9,053	106,764	72,385	7,942
Chrome green (C.P.)[3]	M pounds	570	57	1,000	524	[2]72	1,020
Hydrochloric acid (100% HCl)	Short tons	31,418	18,240	2,575	29,671	15,723	4,158
Hydrogen	Millions of cubic feet	(1)	(1)	(4)	(1)	(1)	(4)
Lead arsenate (acid and basic)	M pounds	(1)	(1)	(1)	(1)	(1)	(1)
Lead oxide — red (100% Pb_3O_4)	M pounds	9,390	266	5,733	8,855	645	4,946
Methanol (natural) (80% CH_3OH)	Gallons	364,434	(4)	312,433	[2]340,660	(4)	[2]310,105
Methanol (synthetic) (100% CH_3OH)	M gallons	6,694	(3)	6,768	6,320	(3)	7,128
Molybdate orange (C.P.)	Pounds	104,933	5,400	165,013	114,147	11,561	[2]157,506
Nitric acid (100% HNO_3)	Short tons	38,958	33,996	7,047	38,161	[2]33,984	[2]6,887
Oxygen	M cu. ft.	(1)	(1)	(3)	(1)	(1)	(3)
Phosphoric acid (50% H_3PO_4)	Short tons	59,147	52,587	13,910	[2]57,807	[2]54,563	12,458
Potassium bichromate and chromate (100%)	M pounds	733	(3)	399	638	(3)	410
Potassium chloride (100% KCl)	Short tons	(10)	(10)	(10)	103,709	(3)	30,895
Potassium hydroxide (caustic potash) (100% KOH)	Short tons	3,736	704	1,949	3,494	700	1,720
Soda ash (commercial sodium carbonate):							
Ammonia soda process—							
Total wet and dry[5] (98%-100% Na_2CO_3)	Short tons	393,823	.....	.....	385,085	.....	.....
Finished light (98%-100% Na_2CO_3)[6]	Short tons	212,240	45,933	22,124	206,990	48,661	21,380
Finished dense (98%-100% Na_2CO_3)	Short tons	126,642	3,214	10,085	124,727	2,396	12,669
Natural[7]	Short tons	15,221	.....	3,341	13,778	.....	1,724
Sodium bicarbonate (refined) (100% $NaHCO_3$)	Short tons	13,077	(3)	5,591	12,791	(3)	5,535
Sodium bichromate and chromate (100%)	Short tons	7,060	(3)	1,195	6,920	(3)	1,403
Sodium hydroxide, liquid:							
Electrolytic process (100% NaOH)	Short tons	100,553	24,971	32,875	99,052	22,480	35,736
Lime-soda process (100% NaOH)	Short tons	57,733	(3)	13,967	58,037	(3)	14,741
Sodium phosphate:							
Monobasic (100% NaH_2PO_4)	M pounds	(1)	(3)	(1)	(1)	(3)	(1)
Dibasic (100% Na_2HPO_4)	Short tons	(1)	(3)	(1)	(1)	(3)	(1)
Tribasic (100% Na_3PO_4)	Short tons	(1)	(1)	(1)	(1)	(1)	(1)
Sodium silicate (water glass):							
Liquid (40° Baumé)	Short tons	97,976	(4)	100,584	88,315	(4)	94,146
Solid (all forms combined)	Short tons	10,548	2,639	8,191	10,809	2,796	8,455
Sodium sulfate:							
Glauber's salt and crude salt cake[7]	Short tons	(1)	(1)	(1)	(1)	(1)	(1)
Anhydrous (refined) (100% Na_2SO_4)	Short tons	(1)	(3)	(1)	(1)	(3)	(1)
Sulfuric acid:[7]							
Chamber process (100% H_2SO_4)	Short tons	272,128	.....	266,448	[2]263,132	.....	[2]287,962
Contact process[8] (100% H_2SO_4)	Short tons	491,179			480,675		
Net contact process[9] (100% H_2SO_4)	Short tons	442,141	.....	.....	428,712	.....	.....
White lead (C.P.), basic lead carbonate	Short tons	5,688	2 198	7,241	5,562	2,480	7,330
White lead (C.P.), basic lead sulfate	Short tons	1,425	.....	1,609	644	.....	1,364
Zinc yellow (C.P.)	M pounds	2,914	274	1,039	[2]2,672	318	928

[1] Not yet available.
[2] Revised. Revised figures on calcium arsenate and calcium carbide prior to February 1944 and on chrome green prior to January 1944 will be shown in a subsequent issue of this release.
[3] Data cannot be published without disclosing the operations of individual establishments.
[4] Not available; see "Facts for Industry," Series 6-1-1.
[5] Total wet and dry production including quantities diverted for manufacture of caustic soda and sodium bicarbonate and quantities processed to finished light and finished dense soda ash. For detailed discussion of soda ash statistics, see "Facts for Industry," Series 6-1-1.
[6] Does not include quantities converted to finished dense soda ash.
[7] Data on this material were collected in cooperation with the Bureau of Mines, U. S. Department of the Interior.
[8] Includes sulfuric acid of oleum grades.
[9] Excludes spent acid. For detailed explanation, see "Facts for Industry," Series 6-1-1.
[10] Data collected and compiled by the Bureau of Mines, U. S. Department of the Interior, beginning May 1944.

to 40 percent in 1942. However this trend was reversed in 1943, when the proportion of butane in gas-company purchases jumped to 58 percent. The propane share in the liquefied petroleum gases credited to gas companies also followed a trend similar to that of butane, dropping from 26 percent of the total in 1940 to 16 percent in 1942 and then up to 22 percent in 1943. Sales of butane-propane mixtures to gas companies followed a reverse pattern from that of butane and propane, increasing from 21 percent of the total requirements in 1940 to 45 percent in 1942 and then a shrinkage to 20 percent of the gas-company item in 1943, as this industry turned strongly to butane and propane for "stand-by" gas.

Butane with its higher B. t. u. content is the better fuel for industrial use; however, manufacturers have had to turn to propane under current conditions. Butane constiuted above 47 percent of the liquefied-petroleum-gas requirements of manufacturing plants in 1940 and 1941, 44 percent in 1942, and 38 percent of the total in 1943. The propane share in the industrial-fuel total has fluctuated irregularly from 47 percent in 1940 to 17 percent in 1941, 18 percent in 1942, and then a strong upward turn to 49 percent of the total for 1943, as manufacturers bought more than three times as much propane as reported for 1942. The percentage of butane-propane mixtures in sales of liquefied petroleum gases to industrial establishments, like for propane, has changed greatly in recent years—constituting 5 percent of the total in 1940, 36 percent in 1941, 38 percent in 1942, and then down to 13 percent of total industrial-fuel requirements in 1943.

Chemical Raw Material

Butane-propane mixtures make up the larger share of liquefied petroleum gases used by chemical plants as raw material, the proportion being about 88 percent of their purchases in 1940 and 1941 and then a shrinkage to 72 percent of the total in 1942 and 1943, as manufacturers of chemicals increased their purchases of butane and propane. Most of the pentane is reported as raw material for chemical plants, and this gas has ranged from 9 percent of the chemical "item" in 1940 to 6 percent in 1943. Butane-propane mixtures are used more than the straight butane and propane as fuel for internal-combustion engines and satisfied about 77 percent of the demand in 1940, 70 percent in 1941, 78 pereent in 1942, and 84 percent of the motor-fuel total in 1943. Butane for engine fuel has declined from 28 percent of the 1941 requirements to 11 percent in 1943, as restrictions on its use were put in force. Propane is not used in important volume as a fuel for internal-combustion engines.

The American Gas Association has cooperated with the Bureau of Mines by supplying the following information concerning the distribution of liquefied petroleum gases by manufactured-gas companies in 1943:

"At the end of 1943, liquefied petroleum gas was being delivered through mains to consumers in 219 communities in 32 states by 101 companies supplying 83,320 consumers.

"Butane-air gas with heating value ranging from 520 to 1,300 B. t. u. per cubic foot was supplied to 157 communities in 30 States. A mixture of undiluted butane and propane gas with a heating value of 2,800 to 3,000 B. t. u. per cubic foot was supplied to 18 communities in Arizona, California and New Mexico. Undiluted propane gas with a heating value of 2,550 B. t. u. per cubic foot was supplied to 41 communities in Maryland, Minnesota, Nevada, New Jersey, North Dakota, Virginia and Wisconsin."

The percentage of bulk shipments of liquefied petroleum gases has tended to increase slightly in recent years as cylinders or other small containers have become difficult to obtain. Liquefied petroleum gases handled in bulk totaled 599,463,000 gallons in 1943 and constituted about 89 percent of all sales compared with 517,504,000 gallons in 1942 or 88 percent of the annual total. Shipments of liquefied petroleum gases in cylinders increased from 67,936,000 gallons in 1942 to 75,770,000 in 1943.

Sales of liquefied petroleum gases in the Pacific Coast area (California, Oregon, Washington, Arizona, and Nevada) increased by 8 percent from 126,905,000 gallons in 1942 to 136,601,000 in 1943. The 1943 total for the Pacific Coast represented 20 percent of the marketed production of liquefied petroleum gases in 1943 compared with a 22-percent share in 1942. Deliveries of liquefied petroleum gases reported for "all other areas" totaled 538,632,000 gallons in 1943, a gain of about 18 percent over the 1942 volume of 458,535,000 gallons.

One hundred fifteen petroleum-refining and natural-gas companies reported their sales of liquefied petroleum gases to the Bureau in 1943 compared with 114 in 1942. Twenty-one companies reported in the Pacific Coast area in 1943 compared with 23 in 1942. In all other areas 94 companies cooperated in the 1943 survey and 91 companies in 1942.

First Quarter Potash Deliveries

The American Potash Institute had announced that total deliveries of potash salts within the continental United States, Canada, Cuba, Puerto Rico and Hawaii by the five major producing companies during the first quarter of the calendar year 1944 amounted to 425,751 short tons of salts, equivalent to 214,496 tons of actual K_2O. Constituting this total were 391,795 tons of salts, equivalent to 193,331 tons K_2O, designed for agricultural use, made up of 260,586 tons of muriate, 94,739 tons of manure salts, and 36,841 tons of sulfates. For chemical use deliveries amounted to 33,956 tons of salts, equivalent to 21,164 tons K_2O. These figures include salts of domestic origin only.

Compared with the first quarter of 1943, these deliveries represent increases of 29,329 tons K_2O, or 18% for agricultural potash and 32,307 tons K_2O, or 18% for all potash delivered during the corresponding period of a year ago.

POTASH DELIVERIES
Short Tons K_2O
(United States, Canada, Cuba, Puerto Rico, Hawaii)

	Jan-Mar. 1944	Jan.-Mar. 1943
Muriate	156,132	137,464
Manure Salts	23,454	15,284
Sulfate and Sul. Pot. Mag.	13,746	11,255
Total Agricultural	193,332	164,003
Chemical Potash	21,164	18,186
GRAND TOTAL	214,496	182,189

Fluorspar Industry Makes New Record

Despite the many difficulties of operation in 1943 the fluorspar industry established an impressive record in supplying the unprecedented demand for this mineral, according to the Bureau of Mines, United States Department of the Interior. Fluorspar is essential in the manufacture of steel, aluminum, high-octane gasoline, refrigerants, insecticides, and other products necessary for the successful prosecution of the war.

Production of finished fluorspar was 405,600 short tons in 1943. In addition, 65,000 tons of crude ore, equivalent to 27,400 tons of finished fluorspar, were mined but not milled in 1943. Thus, total production (expressed in terms of finished fluorspar) was 433,000 tons in 1943 compared with 337,000 tons in 1942. The Illinois-Kentucky district accounted for 75 percent of the total in 1943 as compared with 79 percent in 1942.

Shipments from mines in 1943, amounting to 406,016 short tons, were 13 percent greater than in 1942 (the previous record year) and 54 percent more than in 1918, the peak year reached during World War I. Moreover, production and shipments were 11 and 4 percent, respectively, greater than consumption in 1943, which also reached an all-time high. Illinois not only maintained its rank as the chief producing State by shipping 23 percent more fluorspar than in 1942, the previous record year, but it accounted for 49 percent of the total shipments in 1943. On the other hand, shipments from Kentucky declined for the second successive year and were 18 percent less than in 1942. Colorado and New Mexico also made new records in 1943. Shipments by river or river-rail (49,913 tons) were 37 percent less than in 1942.

Consumption reached an all-time high of 388,885 short tons in 1943 compared

with 360,800 tons in 1942. Steel mills continued to be the principal consumers of fluorspar but the total quantity used in 1943 was 3 percent less than in 1942, notwithstanding that output of basic open-hearth and basic electric steels was 4 percent greater. On the other hand, consumption of fluorspar in the manufacture of hydrofluoric acid, which is essential in the manufacture of artificial cryolite and aluminum fluoride (aluminum raw materials), high-octane gasoline, refrigerating mediums, insecticides, and other products, was 3 percent greater than in 1942 and accounted for 29 percent of the total consumption as compared with 23 percent in 1942. The glass industry, ranking third in importance as a consumer of fluorspar, used 11 percent more than in 1942.

Record Lime Sales in 1943

Sales of lime in 1943 advanced to a new record volume of 6,394,000 short tons or 5 percent over the 1942 sales, according to preliminary figures released by the Bureau of Mines, United States Department of the Interior. The new record resulted from the increased demand for agricultural and chemical lime and dead-burned dolomite which more than compensated for a sharp decline in demand for building lime. Sales of both quick- and hydrated lime were larger than in 1942 in each of the major uses except for building purposes in which the tonnage of each type sold was markedly lower. In 1943, quicklime represented 79 percent and hydrated lime 21 percent of total sales. The second year of war effected further changes in the distribution of sales by uses, and chemical lime represented 64 percent, dead-burned dolomite 19 percent, building lime 9 percent, and agricultural lime 8 percent of the total sales compared with the corresponding percentage distribution in 1942 of 62, 20, 11, and 7 respectively.

Ceiling prices on lime were continued through the year and reportedly, only a few minor upward revisions were made. A severe labor shortage plagued most lime operators throughout 1943. Despite the record demand, a number of plants ceased operations during the year owing to labor, price, or other reasons directly attributable to the war. However, several portland-cement plants favorably situated with regard to lime-consuming industries were partially converted to calcining lime during 1943.

The tonnage of chemical lime sold during 1943 advanced to 4,075,000 short tons, a gain of 8 percent over the former record annual quantity sold in 1942. The increased demand reflects principally the greater activity in production of steel, glass, calcium carbide, and Bayer alumina, of which all showed appreciable gains in 1943 over 1942. Demand for lime for water purification probably rose slightly over 1942 as a continuation of the uptrend in sales for this use in recent years. In other industries that are major consumers of lime—insecticides, paper mills and tanneries—demand probably was lower than in 1942 owing to the decreased activity. It is probable, also, that many of the industries with relatively small annual requirements of lime consumed smaller quantities in 1943 than in 1942 because of war conditions.

Sales of dead-burned dolomite in 1943 gained only 2 percent over the 1942 tonnage; a relatively small increase compared with the larger output of steel in 1943.

Continued war restriction on construction and the types of materials required in most wartime building adversely affected the markets for building lime, and sales in 1943 fell to 579,000 tons, a quantity 17 percent below the 1942 tonnage and nearly at the low level reached during 1933-34. Conservation Order L-41 of War Production Board was amended several times during the year, and the form of November 1 appeared to be more restrictive in total effect on construction than the prior ones. No relief from the war controls on building was in sight at the end of 1943.

Total sales of 488,000 tons of agricultural lime in 1943 were 22 percent larger than the 1942 volume and represented the highest annual quantity since 1917. The gain over 1942 compares favorably with the 24 percent increase reported in cash income from farm marketings which in 1943 was the largest ever recorded.

Table 1—Lime sold or used by producers in the United States, 1942-43 by types and major uses.

	1942		1943 (Preliminary)		
	Short tons	Value	Short tons	Value	Per cent change in tonnage
By types:					
Quicklime	4,810,452	$34,077,137	5,055,000	$37,006,000	+5
Hydrated lime	1,293,339	10,290,304	1,339,000	10,676,000	+4
Total lime	6,103,791	44,367,441	6,394,000	47,682,000	+5
By uses:					
Agricultural:					
Quicklime	184,678	950,374	195,000	1,206,000	+6
Hydrated lime	215,953	1,568,579	293,000	2,260,000	+36
Total	400,631	2,518,953	488,000	3,466,000	+22
Building:					
Quicklime	175,643	1,644,316	140,000	1,310,000	−20
Hydrated lime	522,034	4,528,889	439,000	3,713,000	−16
Total	697,677	6,173,205	579,000	5,023,000	−17
Chemical and industrial:					
Quicklime	3,220,774	20,664,813	3,468,000	23,404,000	+8
Hydrated lime	555,352	4,192,836	607,000	4,703,000	+9
Total	3,776,126	24,857,649	4,075,000	28,107,000	+8
Refractory (dead-burned dolomite)	1,229,357	10,817,634	1,252,000	11,086,000	+2

Boron-Mineral Production Increased in 1943

Production of boron minerals in 1943 recovered from the 1942 slump and has been exceeded only by the record output of 1941, according to the Bureau of Mines, United States Department of the Interior. Five producers, all in California, reported shipments, the same five firms that produced in 1942.

American Potash & Chemical Corporation, 122 East Forty-Second St., New York City, extracted borax from the brines of Searles Lake at its Trona, Calif., plant, and sold borax, dehydrated borax, and boric acid for domestic and foreign consumption in a wide variety of uses but principally in glass. The brine is pumped from wells approximately 70 feet below the crust of the lake and transmitted via pipe line to the plant, 4 miles away. Pacific Alkali Co., 1223 Pacific Mutual Bldg., Los Angeles, recovered borax from the brines of Owens Lake at Bartlett, Calif., chiefly for export.

Pacific Coast Borax Co., the oldest and one of the largest producers, operated its kernite mines at Boron, Calif., and its Wilmington, Calif., refinery, making over 200 boron derivatives, including kernite concentrates, borax, and boric acid for domestic and export trade. Mining and processing of kernite by the Pacific Coast Borax Co. has been reviewed by George A. Connell, in Technology of Borax Production as Practiced by the Pacific Coast Borax Co., a paper delivered at the 106th Meeting, American Chemical Society, Pittsburgh, Pa., Sept. 6 to 10, 1943, and available from the Pacific Coast Borax Co., 51 Madison Ave., New York, N. Y. Kernite is mined by the shrinkage-stope and room-and-pillar methods from the Baker deposit at Boron, near Mojave, and shipped to a refinery at Wilmington, Calif., where it is dissolved in water with the aid of heat and pressure and reprecipitated as sodium tetraborate, or borax.

United States Borax Co., 510 West Sixth St., Los Angeles, mined colemanite (crude calcium borate) near Shoshone, Inyo County, Calif., for conversion into borax at a nearby refinery.

West End Chemical Co., 608 Latham Square Bldg., Oakland, Calif., recovered borax from Searles Lake at its Westend, Calif., plant and sold both borax and dehydrated borax.

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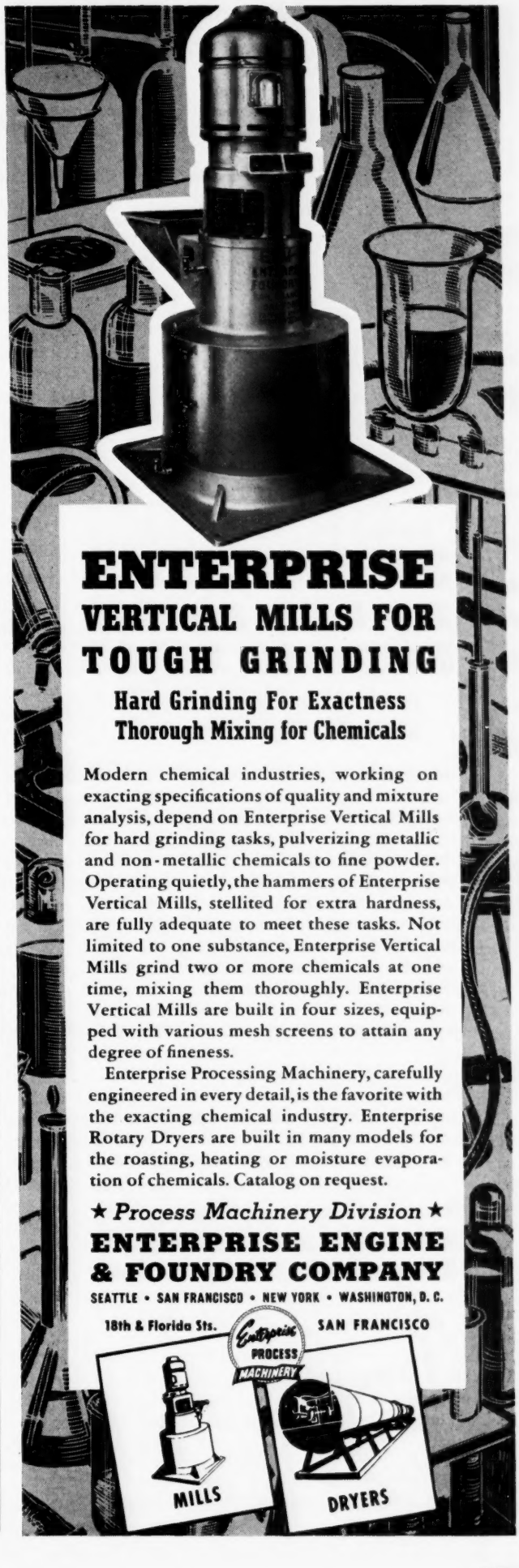

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MARKETS IN REVIEW

Manpower situation becomes more critical.
Second quarter production higher in heavy chemicals.
Competition develops in methanol.
New textile fibers mean new chemical markets.
Military needs still dominate in dyes and textiles.
Prospects for the paint and synthetic coatings industry are bright.
Why civilians are getting no plastics.
Heavy Chemicals, Fine Chemicals, Coal Tar Products, and Paint Materials markets reviewed.

A CRITICAL manpower situation in key consuming lines was not able to make its influence felt on chemical production at the beginning of the third quarter, and the industry's output in the aggregate is holding at a record high level for the war. In terms of the Federal Reserve Board's index for Industrial Chemicals, production rose from 408 in April to 410 in May, and in the light of increased pressure for many chemicals to supply three blazing European war fronts, this figure may have advanced further during June and July.

Employment losses in some chemical-using industries have become a matter of concern to both industry and the Government. The rayon manufacturing field is being especially hard hit as its workers shift to shipyards and other more strategic war work, and the Army found it necessary in mid-July to return skilled rubber workmen to factories in the Akron area. Chemical manufacturers in many instances are hit by manpower losses in the unskilled classifications.

Barring further setbacks in the employment situation, chemical movements on the whole should undergo additional slow expansion, at least until the curtain descends on the European war theatre. And this event, many have come to believe, may take place before the end of 1944. The Department of Commerce shows that the trend of manufacturers' shipments flattened out during the first six months this year after setting a record of 22.7 billion dollars during the fourth quarter of 1943.

Significant production upturns were scored during the second quarter of 1944 in chlorine, synthetic methanol, lime acetate, hydrochloric acid, electrolytic process caustic soda, and in both chamber and contact sulphuric acid. Anhydrous ammonia appeared to be the only important chemical (Ordnance production excluded) to show a setback, and that was slight. Over-all outputs of NH_3 should expand later this year, due to the resumption of full-scale operations at Army plants and the completion of one large private project.

Solvent users in many consuming industries on August 1 next will be given the benefit of expanded production in methanol. A new schedule of prices for this basic processing material effective that time will quote tank cars at 23c a gallon against the former price of 28c, although the adoption of a freight equalization system for methanol (with Niagara Falls and South Charleston) against the previous delivered basis, renders the savings less than 5c a gallon indicated. A considerable percentage of methanol enters formaldehyde conversion processes, and the recent price slash for this product, previously reported, favored consumers using formaldehyde in the textile, phenolic condensation resins, dye and intermediate industries.

Technological advances and free competition, which have been permitted to lower the costs for many chemicals, were factors in the methanol price cut, and they may lead to reductions also in paraformaldehyde, hexamine, methyl acetone. Production data issued in July reflected expansion in methanol processes. Output of synthetic methanol in May reached the high figure of 6,694,000 gallons, against 6,320,000 in April. This means that the industry has attained an annual production basis of 80,328,000 gallons, compared with last year's actual production of 64,968,000 gallons. The wood chemical producers also appear to have overcome the difficulties which beset their industry early in the war. Their methanol outputs in May aggregated 364,434 gallons; better than the April rate of 340,660, although still below monthly production in 1943 which ran up to 464,000 gallons. While the synthetic has been preferred for conversion to formaldehyde, natural methanol is expected to find postwar outlets again as a denaturant for alcohol.

Textile fibers continue to command much attention from the chemical manufacturers, and development in this field may revolutionize textile fabric making and broaden chemical requirements in that industry. Polyethylene, the ethylene polymer resin made in this country by du Pont and Carbide & Carbon Chemicals, is now discussed as a possibility for future textiles. The latter producer evidently has determined the suitability of polyethylene for "filaments" as well as for coating textile fabrics.

Chemical companies supplying the rayon plants with essentials such as carbon bisulfide, sulphuric acid, caustic soda, learn meanwhile that the manpower situation has become that serious that one large acetate producer may be forced to a partial shutdown in the fall. Expansion in smokeless powder is drawing upon rayon makers' labor forces, so are shipyards and munitions plants in other areas. Viscose rayon plants are feeling the transitory labor drift along with the rest. Yet, rayon cloth production is estimated to have expanded some 40 per cent since 1941.

For the future, the rayon industry will have ample supplies of chemicals, and one of the leading industrial chemical manufacturers is erecting a new plant for the production of carbon bisulfide in Virginia, possibly to serve a number of important viscose plants in that section. Carbon bisulfide, obtained basically from coal and sulphur, is a vital chemical in the conversion of alkali cellulose to cellulose xanthate.

Dyestuffs consumption probably has fallen further in view of continued Government restrictions of vat colors for civilian use and the lessened supply of cotton goods. This might be difficult to understand considering that cotton cloth production is now fully 25 to 30 per cent in excess of prewar output. Dyes, finishing and processing chemicals, however, are finding application chiefly in fulfilling heavier weight military cotton goods. Further, unfilled orders on books of cotton mills currently are equivalent to but five or six weeks production, while stocks on hand equal only one to two weeks output. At the beginning of 1943, unfilled orders amounted to as much as 14 weeks cloth production. So even in face of much reduced vat dye supplies there are no complaints over color restrictions. Civilian dye use is still held down to 70 per cent of 1941 consumption, and expectations that the Dye Conservation Order M-103 would be modified have not been fulfilled at this writing. Some manufacturers working on fast vats for essential use also report manpower difficulties.

Paint manufacturers have had more than their share of wartime difficulties, and broader seasonal demand for paint products, marked by good-sized sales upturns in May and June, has to an extent increased the industry's raw

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materials headache. Costs for many basic products used by the paint manufacturers also have gone up steeply in this war while prices for the finished products show only comparatively slight advances. The bright side of the picture is supplied by the industry's normal peacetime outlets—new construction, redecorating and automobiles. The first two should absorb an enormous quantity of paints, varnishes and other coatings during the early postwar years.

Estimates now also call for postwar production of 4,000,000 automobiles annually, which a planning committee of the National Paint, Varnish & Lacquer Association determines will boost the volume of auto finishes some 60 per cent over the 1939-1941 period. Wartime research has provided new types of finishes for motor cars which require less arduous labor such as metal cleaning, sanding and polishing. Resin finishes will be complete in two coats, applied with a heated spray gun, and become dry in 20 minutes.

Protective coatings manufacturers will find their raw materials outlook somewhat more difficult over the rest of 1944, at least as far as solvents are concerned. WPB has already indicated that their supplies of alcohol and butyl acetate will be materially curtailed beginning in August as the result of increased military requirements, or restricted to such civilian top essentials as can enamels and electrical insulation. Ethyl and isopropyl acetate likewise face severe civilian curtailment. And unless an improvement takes place in supplies, the alkyl amines (monomethyl and dimethyl) may be denied entirely for non-war uses.

Phthalic alkyd resin supplies have become that critical that even aircraft specifications have been drawn in order to conserve them. The use of urea and melamine aldehyde resins containing phthalic alkyds is permitted comparatively few protective coatings outside of military need. Toluene and xylene are still carefully allocated each month to this industry. Acetone also is firming up after its recent easier supply trend.

Plastic molders, particularly those using injection equipment, may have to wait until 1945 before they are able to obtain equipment needed for even essential civilian work. During the third quarter this year only eleven pieces of injection equipment will be available. The fourth quarter will find 87 available to molding concerns, but demands are so great that many processors may have to wait until first quarter 1945 allocations are drawn. The supply situation in resins generally shows no great improvement; in the instance of cellulose acetate it appears to have tightened somewhat. This is attributed to manpower shortages partly, also to some unavoidable plant stoppages at producing points. There has been some expansion in the use of cellulose acetate and cellulose acetate butyrate for the manufacture of electrical and communications equipment.

Heavy Chemicals.—Market activity at mid-year did not indicate that consuming lines were expecting additional cutbacks in war production, and contracting was restricted only by available supplies. The previously difficult caustic situation experienced some relaxation in the resale trade and offers were made at $2.65 to $2.75 per 100 lbs. against former prices of $2.85 to $2.90. Copper chemicals came in for active demand although the tonnage sold in sulphate did not come up to expectations owing to smaller occurrence of potato blight. The outlook for fertilizer ammonia became uncertain with the withdrawal of Ordnance ammonia for ammonium nitrate, and Government agencies may arrange for the importations of 1,000,000 tons of Chilean nitrate of soda (bulk) to meet agricultural requirements during 1944-1945. Domestic synthetic nitrate was continued by Barrett for August delivery at $27 per ton, carload lots, f. o. b. Hopewell, Va. The volume of chlorine, activated carbon, other water-treatment chemicals, is said to be running in excess of last year. Seasonal consumption of ammonia for refrigeration and quick-freezing in food plants is also heavy despite cylinder difficulties.

(*Turn to page 309*)

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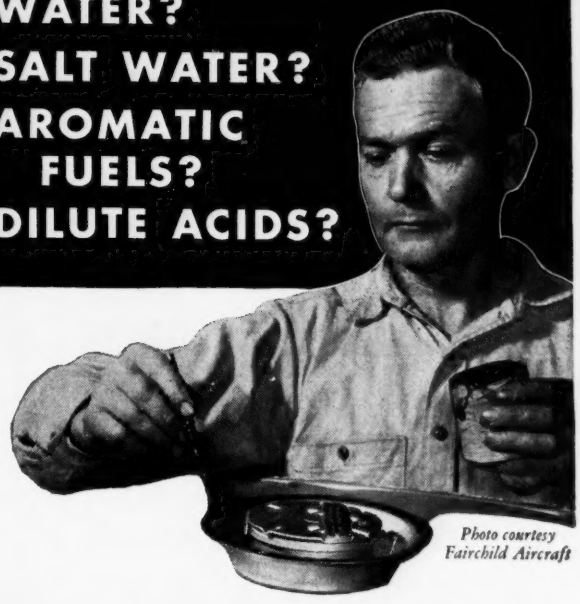

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	Current Market	1944 Low	1944 High	1943 Low	1943 High
Acetaldehyde,99%.drs.wks. lb.	.11	.11	.14	.11	.14
Acetic Anhydride, drs, ...lb.	.11½	.11½	.13	.11½	.13
Acetone, tks, delv (*PC*) ..lb.	...	...	.07	...	.07
ACIDS					
Acetic, 28%,bbls (*PC*) 100 lbs.	3.38	3.38	3.63	3.38	3.63
glacial, bbls. .....100 lbs.	9.15	9.15	9.40	9.15	9.40
tks, wks. .....100 lbs.	...	...	6.93	...	6.93
Acetylsalicylic, Standard USP .....lb.	.40	.40	.54	.40	.54
Benzoic, tech, bbls. .....lb.	.43	.39	.47	.39	.47
USP, bbls, 4,000 lbs. up lb.	...	...	.54	...	.54
Boric, tech, bbls, c-l,....ton *a*	...	...	109.00	...	109.00
Chlorosulfonic, drs, wks. ..lb.	.03	.03	.04½	.03	.04½
Citric, crys, gran, bbls, lb. *b*	.20	.20	.24	.20	.24
Cresylic 50%, 210-215° HB, drs, wks, frt equal gal.	.81	.81	.83	.81	.83
Formic, Dom. cbys .....lb.	.10½	.10½	.11½	.10½	.11½
Hydrofluoric, 30% rubber, dms. .....lb.	.08	.08	.09	.08	.09
Lactic, 22%, lgt, bbls wks lb.	.039	.039	.0415	.039	.0415
44%, light, bbls wks ...lb.	.073	.073	.0755	.073	.0755
Maleic, Anhydride, drs....lb.	.25	.25	.26	.25	.26
Muriatic, 18° cbys ...100 lb.	1.50	1.50	2.45	1.50	2.45
20° cbys, c-l, wks ..100 lb.	...	...	1.75	...	1.75
22° cbys, c-l, wks ..100 lb.	...	...	2.25	...	2.25
Nitric,36°, cbys, wks 100 lbs. *c*	5.00	5.00	5.25	5.00	5.25
38°, c-l, cbys, wks 100 lbs. *c*	...	...	5.50	...	5.50
40°, c-l, cbys, wks 100 lbs. *c*	...	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lbs. *c*	...	...	6.50	...	6.50
Oxalic, bbls, wks (*PC*) ...lb.	.11¼	.11¼	.12½	.11¼	.12½
Phosphoric, 100 lb. cbys, USP .....lb.	.10½	.10½	.13	.10½	.13
Salicylic, tech, bbls (*PC*) lb.	.26	.26	.42	.26	.44
Sulfuric, 60°, tks, wks ..ton	...	...	13.00	...	13.00
66°, tks, wks .....ton	...	...	16.50	...	16.50
Fuming (Oleum) 20% tks. wks .....ton	...	...	19.50	...	19.50
Tartaric, USP, bbls .....lb.	...	...	.70½	...	.70½
Alcohol, Amyl (from Pentane) tks, delv .....lb.	...	...	.131	...	.141
Butyl, normal, syn, tks (PC) .....lb.	...	...	.10¾	.10¾	.14¼
Denatured, CD 14, c-l drs, (*PC, FP*) ....gal. *d*	...	...	.54½	...	.54½
Denatured, SD, No.1, tks. *d*	...	...	.50	...	.50
Ethyl, 190 proof tks...gal.	...	...	17.60	...	11.90
Isobutyl, ref'd, drs ....lb.	...	...	.086	...	.086
Isopropyl ref'd, 91%, dms .....gal.	.39	.39	.66½	.39	.66½
Propyl, nor, drs, wks gal.	.67	.67	.70	.67	.70
Alum, ammonia, lump, bbls, wks .....100 lb.	...	...	4.25	...	4.25
Aluminum, 98-99%, (*FP*) .....100 lb.	15.00	15.00	16.00	15.00	16.00
Chloride anhyd dms wks lb.	.08	.08	.12	.08	.12
Hydrate, light, (A) ....lb.	.14½	.14½	.15	.14½	.15
Sulfate, com, bgs, wks, c-l .....100 lb.	1.15	1.15	1.25	1.15	1.25
Sulfate, iron-free, bgs. wks .....100 lb.	1.85	1.85	2.50	1.75	2.50
Ammonia anhyd, cyl .....lb.	...	...	.16	...	.16
Ammonium Carbonate, lumps, dms .....lb.	.08½	.08½	.09¼	.08¼	.09¼
Chloride,whi,bbls,wks,100 lb.	4.45	4.45	5.15	4.45	5.15
Nitrate, tech. bags, wks..lb.	.0435	.0435	.0850	.0435	.0850
Oxalate pure, grn. bbls..lb.	.27	.27	.33	.27	.33
Perchlorate, kgs (A) ...lb.	.55	.55	.65	.55	.65
Phosphate, dibasic tech, bbls .....lb.	.07¼	.07¼	.08½	.07¼	.08½
Stearate, anhyd, dms ...lb.	...	...	.34	...	.34
Sulfate, dms, bulk (A) ton	28.20	28.20	29.20	28.20	30.00
Amyl Acetate (from pentane) c-l, drs, delv .....lb.	...	...	.15½	...	.18½
Aniline Oil, drs .....lb.	.11½	.11½	.12½	.11½	.12½
Anthraquinone, sub, bbls..lb.	...	...	.70	...	.70
Antimony Oxide, bgs .....lb.	.15	.15	.15½	.15	.15½
Arsenic, whi, kgs (A) ....lb.	.04	.04	.04¾	.04	.04¾

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; **y** Price given is per gal; **c** Yellow grades 25c per 100 lbs less in each case; *d* Prices given are Eastern schedule, *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher;

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Barium Carbonate precip, wks ....ton	60.00	75.00	55.00	75.00	55.00	65.00
Chloride, tech, cyst, bgs, zone 1 ....ton	73.00	78.00	73.00	90.00	77.00	90.00
Barytes, floated, bbls. ....ton	...	36.00	...	36.00	...	36.00
Bauxite, bulk mines (A) ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	(A)	.15	(A)	.15	(A)	.15
Benzyl Chloride, cbys ....lb.	.22	.24	.22	.28	.22	.25
Beta-Naphthol, tech, bbls, wks ....ton	.23	.24	.23	.24	.23	.24
Bismuth metal, ton lots...lb.	...	1.25	...	1.25	...	1.25
Blanc Fixe, 66⅔% Pulp, bbls, wks ....ton *h*	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks, 100 lb.	2.50	3.60	2.50	3.60	2.50	3.60
Borax, tech, c-l, bgs ....ton *i*	...	45.00	...	45.00	...	45.00
Bordeaux Mixture, drs ...lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ....lb.	.25	.30	.25	.30	.25	.30
Butyl, acetate, norm drs, lb.	.1895	.1945	.1755	.1945	.1575	.1840
Cadmium Metal (*PC*) ...lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs. 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ....ton	50.00	95.00	50.00	95.00	50.00	95.00
Carbonate, tech, c-l bgs, ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs c-l ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75% drs, c-l, ton	18.00	31.50	18.00	31.50	18.00	31.50
Gluconate, U.S.P., drs. lb.	.57	.58	.57	.58	.57	.58
Phosphate, tri, bbls, cl ..lb.	...	.0635	.0635	.0785	.0635	.0785
Camphor, U.S.P., gran, powd, bbls ....lb.	.69	.71	.68½	.71	.68½	.70½
Carbon Bisulfide, 55-gal drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl ....lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, (*FP*) (*PC*) Zone 1, 52½ gal, drms ....lb.	.73	.80	.73	.80	.73	.80
Casein, Acid Precip, bgs, 100 or more ....lb.	...	.24	...	.24	...	.24
Chlorine, cyls, lcl, wks, contract (*FP*) (A) ....lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract ...lb. *j*	...	.05¼	...	.05¼	...	.05¼
Liq, tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs ....lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude ....bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt Acetate, bbl (A) lb.	...	.83¾	...	.83¾	...	.83¾
Oxide, black kgs (A) ..lb.	...	1.84	...	1.84	...	1.84
Copper, metal *FP, PC* 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls.lb.	.19½	.20	.19½	.20	.19½	.20½
Sulfate, bgs, wks crypt. (A) ....100 lb.	5.00	5.50	5.00	5.50	5.00	5.50
Copperas, bulk, c-l, wks ..ton	...	14.00	...	14.00	...	14.00
Cresol, USP, drs, (A)....lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
Cyanamid, bgs ....ton	1.52½	1.62½	1.52½	1.62½	1.52½	1.62½
Dibutylamine, c-l, drs, wks lb.	...	.61	...	.61	...	.61
Dibutylphthalate, drs ....lb.	.1960	.2160	.1780	.2500	.2060	.2300
Diethylaniline, lb drs ....lb.	...	.40	...	.40	...	.40
Diethyleneglycol,drs,lcl.wks lb.	.14½	.15½	.14	.15½	.14	.15½
Dimethylaniline, dms.cl.,lcl lb.	.23	.24	.23	.24	.23	.24
Dimethyl phthalate, drs ..lb.	.1875	.1925	.1875	.1925	.1875	.2050
Dinitrobenzene, bbls ....lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls ....lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms ....lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks ....lb.	.16	.20	.16	.20	.15	.20
Diphenylamine bbls ....lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs ...lb.	...	.35	...	.35	.35	.37
Ethyl Acetate, tks, frt all'd lb.	.1070	.1175	.1070	.1175	.107	.110
Chloride, drs ....lb.	.18	.20	.18	.20	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms ....lb.	...	.0891	...	.0891	...	.0842
Glycol, dms, cl. ....lb.	...	.10	...	.10	...	.10
Fluorspar, No. 1, grd. 95-98% bulk, cl-mines ....ton	...	37.00	...	37.00	...	37.00
Formaldehyde, c-l, bbls, kgs, wks (*FP, PC*)....lb.	.0550	.06	.0550	.06	.0550	.0575
Furfural tech, dms, c-l,wks lb.	...	.12½	...	.12½	...	12½
Fusel Oil, refd, dms, dlvd lb.	.18½	.19½	.18½	.19½	.18½	.19½
Glauber's Salt, Cryst,c.l.,bgs, wks ....100 lb.	1.05	1.25	1.05	1.25	1.05	1.25
Glycerin (*PC*) CP, dms, c-l, ...lb.	...	.18¾	...	.18¾	...	.18¾
Saponification, dms, c-l, lcl. or tks ....lb.	...	.12¾	...	.12¾	...	.12¾

GUMS

Gum Arabic, amber sorts bgs ....lb.	.11½	.12	.11½	.14	.13½	.17½
Benzoin Sumatra, CS ....lb.	.52	1.00	.52	1.00	.52	1.00
Copal, Congo ....lb.	...	.55¾	...	.55¾	...	.55¾
Copal, East India, chips ..lb.	...	.12	...	.12	...	.12
Macassar dust ....lb.	...	.07⅜	...	.07⅜	.07⅜	.11¾
Copal Manila,	.13½	.15½	.13½	.15½	.13½	.15½
Copal Pontianak, bold c-l lb.	...	.23⅜	...	.23⅜	...	.23⅜
Ester ....lb.	.09½	.12	.09½	.12	.09½	.12
Karaya, bbls, bxs, dms, ...lb.	.18	.40	.18	.40	.14	.40

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.
⅛s higher than NYC prices; *y* Price given is per gal.

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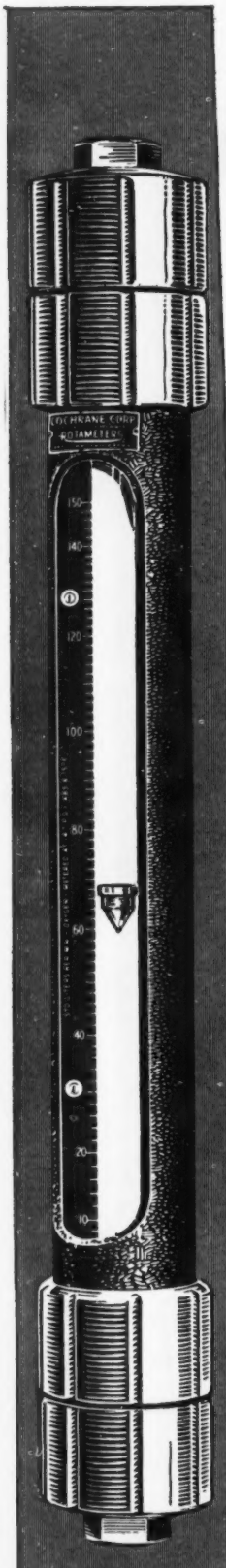

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ROTAMETERS

Current Prices

Gums
Salt Cake

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Kauri, N Y (A)					
Pale XXX ..... lb.	...	.65¼	.65¼	...	.65¼
No. 3 ..... lb.	...	.22	.22	...	.30
Sandarac, cs ..... lb.	1.40	nom.	1.40 nom.	1.40	nom.
Tragacanth, No. 1, cases lb.	4.50	5.00	4.00 5.25	4.00	5.25
No. 3 ..... lb.	2.75	3.00	1.10 3.50	1.10	1.20
Yacca, bgs (*PC*) ..... lb.	.06	.07¼	.06 .07¼	.06	.07¼
Hydrogen Peroxide, cbys .. lb.	.15½	.18½	.15½ .18½	.15½	.18½
Iodine, Resublimed, jars .. lb.	2.00	2.10	2.00 2.10	2.00	2.10
Lead Acetate, cryst, bbls... lb.	...	.12½	... .12½	...	.12½
Arsenate, St. bg, lcl .... lb.	.11½	.12	.11½ .12	.11½	.12
Nitrate, bbls ..... lb.	...	.12½	... .12½	...	.12½
Red, dry, 95% Pb_3O_4, lcl lb.	.09	.10¾	.09 .11	.09	.11
97% Pb_3O_4 bbls delv.. lb.	.09¼	.11	.09¼ .11	.09¼	.11
98% Pb_3O_4, bbls delv.. lb.	09½	.11¼	.69½ .11¼	.09½	.11¼
White, bbls ..... lb.	.08¼	.08¾	.08¼ .08¾	.08¼	.08¾
Basic sulfate, bbls, lcl lb.	.07½	.08	.07¼ .08	.07¼	.08
Lime, Chem., wks, bulk.. ton	6.25	13.00	6.25 13.00	6.25	13.00
Hydrated, f.o.b. wks .. ton	8.50	16.00	8.50 16.00	8.50	16.00
Litharge, coml, delv, bbls lb.	.08	.09¾	.08 .09¾	.08	.09¾
Lithopone, ordi., (*PC*), bgs lb.	.04¼	.04¾	.04¼ .04¾	.04¼	.04¾
Magnesium Carb, tech, wks lb.	.06¼	.09¾	.06¼ .09¾	.06¼	.09¼
Chloride flake, bbls, wks c-l ..... ton	...	32.00	... 32.00	...	32.00
Manganese, Chloride, Anhyd. bbls ..... lb.	.15	.18	.15 .18	.14	nom.
Dioxide, Caucasian bgs, lcl ..... ton	...	74.75	... 74.75	...	74.75
Methanol, pure, nat, drs gal *l*	.63	.76	.63 .76	.63	.76
Synth, drs cl..... gal. *m*	.31	.38	.31 .40½	.34½	.40½
Methyl Acetate, tech tks.. lb.	.06	.07	.06 .07	.06	.07
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½ .10½	.09½	.10½
Chloride, cyl ..... lb.	.32	.40	.32 .40	.31	.40
Ethyl Ketone, tks, frt all'd lb.	...	.08	... .08	...	.08
Naphtha, Solvent, tks ...gal.	...	.27	... .27	...	.27
Naphthalene, crude, 74°, wks tks ..... lb.	...	.0275	... .0275	...	.0275
Nickel Salt, bbls, NY..... lb.	.13	.13½	.13 .13½	.13	.13½
Nitre Cake, blk ..... ton	...	16.00	... 16.00	...	16.00
Nitrobenzene, drs, wks ... lb.	.08	.09	.08 .09	.08	.09
Orthonisidine, bbls ..... lb.	...	.70	... .70	...	.70
Orthochlorophenol, drs ... lb.	...	.32	... .32	...	.32
Orthodichlorobenzene, drms lb.	.07	.08	.07 .08	.07	.08
Orthonitrochlorobenzene, wks ..... lb.	.15	.18	.15 .18	.15	.18
Orthonitrotoluene, wks, dms lb.	...	.09	... .09	...	.09
Para aldehyde, 98%, wks lcl. ..... lb.	...	.12	... .12	...	.12
Chlorophenol, drs ..... lb.	...	.32	... .32	...	.32
Dichlorobenzene, wks .. lb.	.11	.15	.11 .15	.11	.15
Formaldehyde, drs, wks (*FP*) ..... lb.	.23	.24	.23 .24	.23	.24
Nitroaniline, wks, kgs.. lb.	.43	.45	.43 .45	.43	.45
Nitrochlorobenzene, wks lb.	...	.15	... .15	...	.15
Pentaerythritol, tech, bl lb.	.29	.33	.29 .33	.29	.35½
Toluenesulfonamide, bbls lb.	...	.70	... .70	...	.70
Toluidine, bls, wks .... lb.	...	.48	... .48	...	.48

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast ..... gal.	...	11½	... .11½	...	.11
Naphtha, V.M.P., East tks, wks ..... gal.	...	.11	... .11	...	.11
Petroleum thinner, 43-47, East, tks, wks ..... gal.	.08¾	.09½	.08¾ .09½	.08¾	.09½
Rubber Solvents, standard, East, tks, wks .. gal.	...	.11	... .11	...	.11
Stoddard Solvents, East, tks, wks ..... gal.	...	.10	... .10	...	.09½
Phenol, U.S.P., drs (A) .. lb.	.10½	.11¼	.10½ .11¼	.10½	.13¼
Phthalic Anhydride, cl and lcl, wks (A) ..... lb.	.13	.14	.13 .14	.13	.15½
Potash, Caustic, wks, sol lb.	.06¼	.06¾	.06¼ .06¾	.06¼	.06¾
flake, 88-92% ..... lb.	.07	.07½	.07 .07½	.07	.07½
liquid, tks ..... lb.	...	.02¾	... .02¾	...	.0275
dms, wks ..... lb.	.03	.03½	.03 .03½	.03	.03⅛
Potassium Bichromate csks *(*FP*) ..... lb.	.09⅝	.10	.09⅝ .10	.09⅝	.10
Carbonate, hydrated 83-85% calc ..... lb.	.05½	.05¾	.05½ .05¾	.05½	.05¾
Chlorate crys, bgs, wks (A) lb.	.11	.13	.11 .13	.11	.13
Chloride, crys, tech, bgs, kgs ..... lb.	.08	nom.	.08 nom.	.08	nom.
Cyanide, drs, wks ..... lb.	...	.55	... .55	...	.55
Iodide, bots., or cans... lb.	1.44	1.48	1.44 1.48	1.44	1.48
Muriate, dom, 60-62-63% K_2O bulk unit-ton... ton	...	.53½	... .53½	.53½	.56
Permanganate, USP, wks (*FP*) dms ..... lb.	.20½	.21	.20½ .21	.20½	.21
Sulfate, 90%, basis, bgs ton	...	36.25	... 36.25	...	36.25
Propane, group 3, tks (*PC*) gal.	...	.03¾	... .03¾	...	.03¾
Pyridine, ref., drms ..... lb.	.45½	.46	.45½ .46	.45½	.46
R Salt, 250 lb bbls, wks lb.	...	.65	... .65	...	.65
Resorcinol, tech., drms, wks lb	.68	.75	.68 .75	.68	.75
Rochelle Salt, cryst ..... lb.	.43½	.47	.43½ .47	.43½	.47
Salt Cake, dom. blk wks .ton	...	15.00	... 15.00	...	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.

* Spot price is ½c higher.

Current Prices

Saltpetre Oils & Fats

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Saltpetre, grn, bbls ...100 lb.	8.20	8.60	8.20	8.60	8.20	8.60
Shellac, Bone dry, bbls ..lb. r	.42½	.46	.42½	.46	.42½	.46
Silver Nitrate, 100 oz, bots .....oz.	...	.32⅜	...	.32⅜	...	.32⅜
Soda Ash, 58% dense, bgs, c-l, wks .....100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs cl....100 lb.	1.05	1.13	1.05	1.13	...	1.13
Caustic, 76% flake drms, cl .....100 lb.	...	3.70	...	3.70	...	2.70
76% solid, drms,cl 100 lb.	...	2.30	...	2.30	...	2.30
Liquid, 47-49%, sellers, tks .....100 lb.	...	1.95	...	1.95	...	1.95
Sodium Acetate, anhyd. dms .....lb.	.05½	.06	.05	.06	.05	.06
Benzoate, USP dms ....lb.	.46	.52	.46	.52	.46	.52
Bicarb, bbl, wks ...100 lb.	1.70	2.05	1.70	2.05	1.70	2.05
Bichromate,cks,wks l.c.l. lb.	.07½	.07¾	.07½	.07¾	...	.07¾
Bisl fite powd, bbls, wks .....100 lb.	3.00	3.60	3.00	3.60	3.00	3.60
35-40% bbls, wks ..100 lb.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, bgs, wks c.l. lb.	...	.06¼	...	.06¼	...	.06¼
Cyanide, 96-98%, wks ..lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, wks lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks .....100 lb.	...	2.25	...	2.25	...	2.25
Metasilicate, gran, bbl, wks c-l .....lb.	...	2.50	...	2.50	...	2.50
Nitrate, imp, bgs (A) ton	...	33.00	...	33.00	...	33.00
Nitrite, 96-98% dom, cl. lb.	...	.06¾	...	.06¾	...	.06¾
Phosphate, di wks ..100 lb.	6.00	7.25	6.00	7.25	6.00	7.25
Tri-bgs, cryst, wks 100 lb.	2.70	3.40	2.70	3.40	2.70	3.45
Prussiate, yel, bbls, wks lb.	.10	.10¼	.10	.10¼	.10	.11
Pyrophosphate,bgswks c-l lb.	.0528	.0610	.0528	.0610	.0528	.0610
Silicate, 52°,drs. wks 100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, drs, wks, c-l 100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY ..lb.	.06½	.12	.06½	.12	.05	.12
Sulfate tech. Anhyd, bgs 100 lb.	1.70	1.90	1.70	1.90	1.70	1.90
Sulfide, cryst c-l, bbls, wks .....100 lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, wks .....lb.	3.15	3.90	3.15	3.90	3.15	3.90
Starch, Corn, Pearl, bgs .....100 lb	...	4.08	...	4.08	...	3.47
Potato, bgs, cl .....lb.	...	.0637	...	.0637	...	.0637
Rice, bgs .....lb.	no stocks		no stocks		.09½	.10¼
Sweet Potato, bgs ..100 lb.	no stocks		...	.07½	...	.07½
Sulfur, crude, mines ....ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls, kgs .....lb.	.18	.30	.18	.30	.18	.30
Roll, bbls.....100 lb.	2.40	2.90	2.40	2.90	2.40	2.90
Sulfur Dioxide, liquid, cyl lb.	.07	.08	.07	.08	.07	.08
tks, wks .....lb.	...	.04	.04	.06	.04	.06
Talc, crude, c-l, NY .....ton	...	13.00	...	13.00	...	13.00
Ref'd, c-l, NY .....ton	13.00	21.00	13.00	21.00	13.00	21.00
Tin, crystals, bbls, wks ..lb.	no stocks		no stocks		no stocks	
Metal, (*PC*) (A) .....lb.	...	.52	...	.52	...	.52
Toluol, drs, wks .....gal.	...	.33	...	.33	...	.33
tks, frt all'd (*FP*) ....gal.	...	.28	...	.28	...	.28
Tributyl Phosphate, dms lcl, frt all'd .....lb.	...	.47	...	.47	...	.47
Trichlorethylene, dms, wks lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate .....lb.	.25	.54½	.24	.54½	.24	.54½
Triethylene glycol, dms lcl lb.	...	.19½	...	.26	...	.26
Triphenyl Phos, bbls .....lb.	.31	.32	.31	.32	.31	.32
Urea, pure, cases .....lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs .....lb.	no stocks		.25	nom.	.25	.26
Bees, bleached, cakes....lb.	...	.60	...	.60	...	.60
Candelilla, bgs crude...ton	.34½	.44½	.34½	.48	.38	.48
Carnauba, No. 1, yellow, bgs, ton .....lb.	.83¼	.93¼	.83¼	.93¼	.83¼	.93¼
Xylol, Indus. frt all'd, tks, wks .....gal.	...	.27	...	.27	...	.27
Zinc Chloride tech fused, wks .....lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer, bgs, wks..lb.	.07¼	.07½	.07	.07½	.07	.07½
Sulfate, crys, bgs, ..100 lb.	3.60	4.35	3.60	4.35	3.60	4.35

Oils and Fats

Babassu, tks, futures ....lb.	...	.111	...	.111	...	.111
Castor, No. 3, bbls .....lb.	.13¾	.14¼	.13¾	.14¼	.13¾	.14¼
China Wood, drs, spot NY lb.	...	.39	...	.39	...	.39
Coconut, edible, drs NY ..lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms..gal.	...	.88	...	.90	...	.90
Corn, crude, tks, wks ....lb.	...	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l ...lb.	...	.1510	...	.1510	...	.1530
Menhaden, tks .....gal.	...	.1180	...	.1225	...	.1225
Light pressed, drs .....lb.	...	.1260	.1208	.1307	.1305	.1307
Oiticica, liquid, tks .....lb.	... no stocks		.21	.25	...	.25
Oleo, No. 1 bbls, NY ....lb.	.13¾	nom.	.13¾	nom.	.13¾	nom.
Palm, Niger, dms .....lb.	...	.0865	...	.0865	...	.0865
Peanut, crude, tks, f.o.b. wks .....lb.	...	.13	...	.13	...	.18
Perilla, crude dms, NY(A) lb.	no stocks		...	.245	...	.245
Rapeseed, denat, bulk ....lb.	...	.1150	...	.1150	...	.1150
Red, dms .....lb.	.12¾	.13¾	.12¾	.14¾	.13¼	.14¼
Soy Bean, crude, tks, wks lb.	...	.1175	...	.1175	...	.1175
Tallow, acidless, bbls ....lb.	...	.14¼	...	.14¼	...	.14¼
Turkey Red, single, drs ..lb.	.10	.14½	.10	.14½	.10	.14½

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BOX 1938

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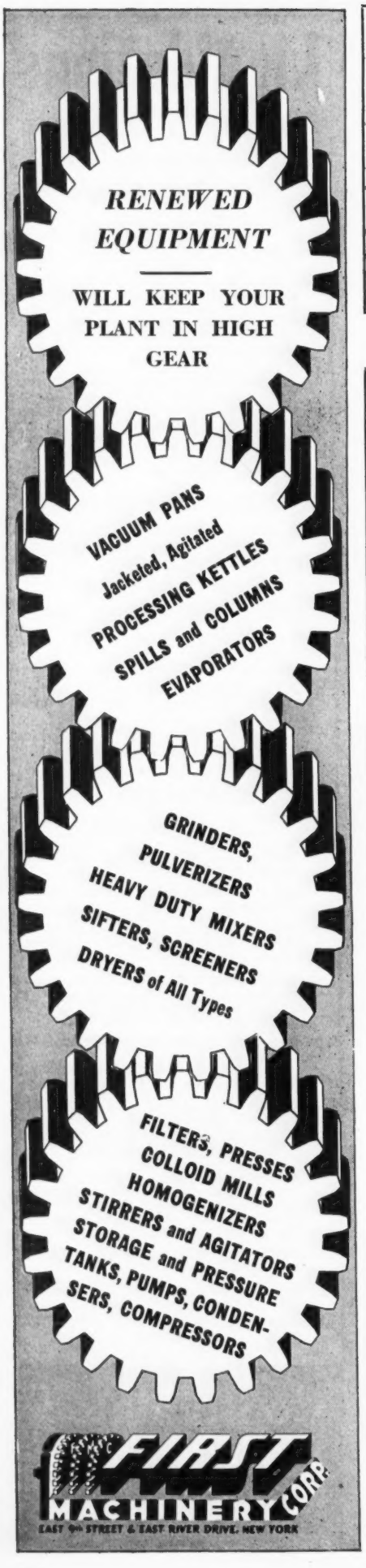

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BOX 1939

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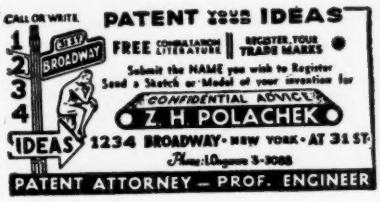

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Full details of this position will be given to any man whose reply indicates that he may have the qualifications. Judgment, character and proven experience in successful leadership are of equal importance with technical background. BOX NO. 1940.

Chemist or Chemical Engineer with specific experience in the manufacture of benzaldehyde by the catalytic vapor phase oxidation of toluene wanted by large company manufacturing chemicals. Write detailed record of experience, draft status and availability. Enclose recent photograph. Box No. 1941.

WANTED—Chemist, for research and production on pigments. Staten Island location. Permanent position for right man. State education, experience and salary desired. Box No. 1943.

WANTED—Production man, experienced in chemical plant. Permanent position in Staten Island. Give full facts concerning experience, education and salary desired. Box No. 1944.

Between the Lines

(*Continued from Page 238*)

this number were subject to some form of public purchase. Only two imported products in the last quarter of 1943 were brought in exclusively through other than private import channels.

Most of the surpluses of materials procured by the Government abroad consist of metals and minerals, a greater part of which have come from Canada, Latin America, India, South Africa, and the Belgian Congo. Most of them have been brought in through pre-war channels, the Government having taken a hand only where stockpiling has been necessary, or in meeting exceptional difficulties of high risk or costs, or to eliminate competitive price situations among the United Nations.

Surpluses in the above category are not expected to be large. They will consist mainly of goods in transit to the United States, but may also include stocks which have accumulated abroad through lack of shipping, or which were purchased beyond this country's immediate needs. Some reasons for the latter action, it has been disclosed incidentally, have been the assumed necessity to keep up these purchases to avoid a sudden dislocation in some foreign country's economy, or to avert a possible serious effect on this country's foreign economic relations. Whatever implications may be contained in these broad phrases can be interpreted to suit the reader. There has been preclusive buying of some materials, as is generally known. The purpose is to prevent such goods in neutral countries from reaching enemy hands. However, this type of purchases will yield few surpluses, it is predicted by officials.

One important recommendation has been urged, that "it should be the policy to prevent the re-entry into the United States of surplus property sold abroad, or of surplus goods sold in the United States on condition that they be exported."

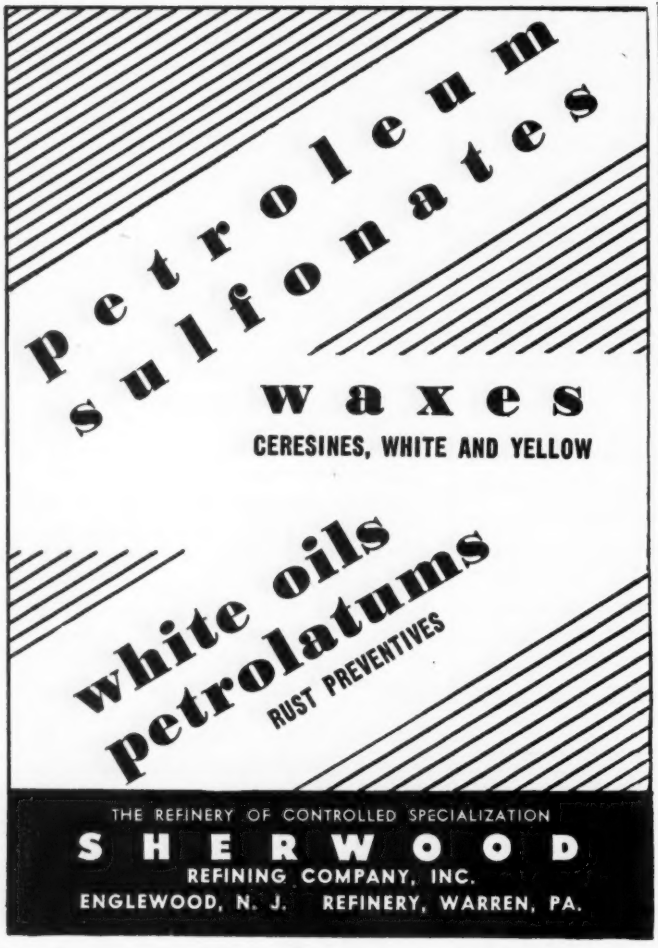
Markets

(*Continued from Page 300*)

Fine Chemicals.—Relaxation of alcohol restrictions as to permit up to 50 per cent of fourth quarter quotas for use at this time will enable cosmetic manufacturers to prepare finished goods for the Christmas trade. WPB meanwhile has decided against further "holidays" in the beverage alcohol industry in addition to the August program. A dwindling stockpile is cited as the reason. War alcohol needs for 1945 are placed by WPB at 604,000,000 gallons, 190 proof, against an estimated potential supply of 639,800,000 gallons. Requirements for this year have been revised downward to 614,300,000 gallons, from 633,900,000, and the supply has been revised to 586,200,000 gallons, from the earlier figure of 612,000,000. Importations of Brazilian menthol virtually ceased owing to the discrepancy between the OPA ceiling here ($15 per lb.) and the Brazilian market ($16.75 to $18.00). Quicksilver remains unsettled following its recent decline, and after falling below the $100 per flask level the metal has recovered slightly above that. Glycerine supplies are now said to be ample for all domestic requirements and more export inquiry is noted for this item.

Coal Tar Products.—The War Production Board has tightened up its allocations of nitrobenzol, and grants of this item as well as of toluol were reduced in July. Less toluol will go to dye and intermediate processes. War demands for all coal tar and coke-oven chemicals remain at a high level. Pyridin of British manufacture has been offered on this market to relieve a tight situation created by its increasing use in the manufacture of sulfa compounds and synthetic vitamins. Heavy demands for phthalic anhydride production has adversely affected the supply of naphthalene, and shipments of the latter for other purposes has been delayed.

Paint Materials.—Shipping has been added to the various difficulties handicapping paint manufacture, the others being manpower, containers and raw materials. Casein, oiticica, and some varnish gums are proving difficult to bring in. British ceilings on purchases of shellac from India will be removed when private transactions are resumed after October 1. Channel black shipments increased in June.



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"WE"-EDITORIALLY SPEAKING

As mentioned elsewhere in this issue, James M. Crowe leaves Chemical Industries this month to handle advertising and market development work for Heyden Chemical Corporation.

We're mighty sorry to see Jim leave. During his four years on the editorial staff he has contributed much to the development and success of the magazine and has carried an increasing share of the editorial responsibility. Suffice it to say we'll miss him. Our best wishes go with him to the new job.

Also at this time we take pleasure in introducing the newest member of the Chemical Industries editorial family—Dr. Howard C. E. Johnson. Dr. Johnson comes to us from the Bridesburg, Pa., research laboratories of the Rohm & Haas Company. He holds degrees in chemistry from both the University of Illinois and the University of Wisconsin, having attended the latter on a Wisconsin Alumni Research Foundation Fellowship. He is a member of Alpha Chi Sigma and the American Chemical Society. His first contribution to the pages of Chemical Industries will be found on page 226 of this issue, wherein he describes the new Forest Products Laboratory process for making alcohol from wood waste by hydrolysis.

In the second of our series on postwar demands for chemicals, in this issue, Doug Woolf of the Textile Research Institute makes the significant observation that the major trend in the textile industry is a shifting of emphasis from mechanical to chemical aspects. He writes that not only has the chemical industry a great stake in synthetic fiber use and in the extension of textile finishes, but it also has a tremendous interest in the relationship between the textile and other industries. See this article, on page 218, for a long range glimpse of chemical markets.

Speaking of textiles reminds us of a statement by Dr. Frank A. Schoenfeld, technical director of the chemical division of B. F. Goodrich Co., that, "we may see the day when we will put on new clothes every time we dress, sending our soiled synthetic garments to be reclaimed rather than cleaned or washed."

Thermoplastic fiber wearing apparel made by paper manufacturing or plastic extrusion techniques, instead of by weaving, may usher in the day when a person would tear off a suit as he would a paper towel, to be discarded as soon as soiled.

Fifteen Years Ago

From Our Files of August, 1929

American Manganese Producers Association will hold annual convention at the Mayflower Hotel, Washington, D. C., September 9 and 10.

Marley Chemical Co., New York, announces the acquisition of a plant at Elizabeth, N. J., and the beginning of the manufacture of cellulose acetate solution.

E. I. du Pont de Nemours & Co., Inc., secures complete control of Lazote, Inc.

Plant of Virginia Cellulose Co., Hopewell, Va., which has operated as a separate unit of the Hercules Powder Co., Wilmington, for three years, is merged with the general Hercules organization.

Charles J. Brand, executive secretary, National Fertilizer Association, is a delegate to the fifth congress of the International Chamber of Commerce, in Amsterdam, Holland, July 8 to 13.

William A. Hart, director of advertising, E. I. du Pont de Nemours & Co., is elected vice-president, National Better Business Bureau.

I. G. Farbenindustrie and Standard Oil Co. of New Jersey are reported to have reached a working agreement, the most immediate effect of which is the utilization of the I. G.'s hydrogenation patents by the oil company.

United Chemicals, New York, which holds a controlling interest in Westvaco Chlorine Products, purchases over 97 percent of the capital stock of Monarch Chemical Co., New York.

American Cyanamid Co. completes arrangements for the acquisition of the Selden Co., Pittsburgh. This latest acquisition brings under the centralization plan a source of a number of organic intermediates used by Cyanamid.

Calco Chemical Co., Inc., Bound Brook, N. J., acquires May Chemical Works, Newark, N. J.

American Chemical Society will hold its seventy-eighth meeting at the University of Minnesota, September 9-13.

Shawinigan Chemicals, Ltd., is now recognized in the United States and Great Britain, as well as in Canada, as an outstanding organization in its line. This company was formed last year by a merger of Canada Carbide, Ltd., and Canadian Electro Products Co., Ltd.

Proponents of power alcohol or "alky-gas" legislation keep pushing their schemes to require the blending of a certain amount of alcohol with all gasoline sold in this country.

Based principally on political considerations rather than on technical and economic facts the question is likely to get hot after the war.

In addition to its uneconomic aspects a further complication that worries oil people is the processing and marketing problems involved. Alcohol must be dehydrated to 99.5 percent for use in motor fuel, a costly process as any chemist will realize. The presence of water in alcohol causes separation of the alcohol from the gasoline and engine trouble results. The special care which would be required in handling alcohol-gasoline blends would require new types of marketing equipment which would increase costs.

Back about 1922 an alcohol-gasoline fuel was introduced in the Baltimore area but proved a failure as the blend absorbed moisture and the solvent action of the alcohol was loosening sediment and clogging fuel lines. The public kicked to such an extent that the product was withdrawn.

Something new has been added to chewing gum by Dr. William J. Hale, well-known research chemist of the Dow Chemical Co. The something new is a chlorophyll-carotinoid chewing gum. So far the new gum has been marketed only in Midland, Michigan—the home town of Dr. Hale and Dow, due to the shortage of gum chicle. The idea for the new-type gum came when Dr. Hale read an article in a medical journal on the healing qualities of chlorophyll against sinusitis and pyorrhea.

Magnesium is now being made in this country at a cost of 13 cents a pound, exclusive of depreciation. Where are those who said it couldn't be done?

Did you know that prewar consumption of sulfuric acid in the United States was about 125 lbs. per year for every person.

PART 2: PATENTS AND TRADEMARKS

Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of patents are available from the Patent Office at 10 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

From Official Gazette—Vol. 563, Nos. 2, 3, 4—Vol. 564, No. 1—June 13-July 4, '44—p. 515

*Medicinals

2-Amino-4-methylhexane and its acid addition salts. No. 2,350,318. Horace Shonle and Ewald Rohrmann to Eli Lilly & Co.

Manufacture of derivatives of saturated and unsaturated cyclopentanopolyhydrophenanthrene series, comprising converting an aldehyde of this series into a secondary alcohol, by reaction with an organo metallic compound. No. 2,350,792. Karl Miescher and Albert Wettstein to Ciba Pharmaceutical Products, Inc.

Therapeutic hesperidin compound of formula $C_{28}H_{33}O_{15}$, COOR wherein R represents a lower alkyl radical. No. 2,350,804. Masaki Ohta.

*Metals, Alloys

Refining metals or alloys of lead and tin to remove impurities present in amounts not greatly in excess of amount soluble in a melt formed of the impure metal being refined and will float to surface of said melt. No. 2,348,719. Bernhard Blumenthal to American Smelting & Refining Co.

Controlling the magnesium content of electrolytes used in electrowinning of manganese containing manganese in the form of manganese sulfate. No. 2,348,742. Charles Mantell and William Hammerquist to Electro Manganese Corp.

Production of protective layers of oxide on objects made of magnesium or magnesium alloys comprising making said objects the anode in a bath containing an alkali arsenate. No. 2,348,826. Ernst Krause and Ernst Schroder.

Producing cemented hard metal compositions comprising a carbide substance selected from carbides of boron, titanium, silicon, tantalum, columbium, vanadium, chromium, tungsten and molybdenum as major portion and a considerably lower melting metallic binder phase as minor portion. No. 2,349,052. Joseph Ollier.

Electrolytic process for coating aluminum and aluminum alloys. No. 2,349,083. Michael Farr, Jr. to The B. & T. Floor Co.

Recovering finely-divided magnesium and magnesium-base alloy scrap. No. 2,349,190. William Newhams to The Dow Chemical Co.

Recovering nickel content of garnierite ores which contain iron. No. 2,349,223. Norman Hedley and John Kress to American Cyanamid Co.

Iron or steel product which has, as an inclusion in noneutectic relation to the iron, a compound, of an element of sulfur, phosphorus, titanium, silicon. No. 2,349,266. James Hartley and Otto Henry to Minerals and Metals Corp.

Heat treating nickel-chrome-tungsten alloy steels. No. 2,349,319. Arthur Wheeler to General Electric Co.

Rolling magnesium and its alloys which comprises providing surface of material to be rolled with a resin-like coating. No. 2,349,395. Julius Zublin.

Apparatus for production of metallic magnesium by reducing magnesium oxide-containing material with aid of reducing agents, capable of furnishing solid reduction products. No. 2,349,408. Harry Davis, Clarita Davis, administratrix, to The Anglo California National Bank of San Francisco as trustee for Reconstruction Finance Corp.

Method and apparatus for the production of magnesium. No. 2,349,409. Harry Davis, deceased, by Clarita Davis, administratrix, to The Anglo California National Bank of San Francisco as trustee for Reconstruction Finance Corp.

Recovering values from magnesian ores containing amounts of minerals from bronzite, hypersthene, bastite, grunerite, cummingtonite, olivene, serpentine, meerschaum, steatite, enstatite and forsterite. No. 2,349,556. William Kleckner to J. A. McCarthy.

Apparatus for zinc smelting. No. 2,349,619. George Halfacre to The New Jersey Zinc Co.

Production of low carbon iron or steel directly from iron ore. No. 2,349,688. Flavius Wood, Jr.

Art of producing selenium. No. 2,349,697. Nevin Bierly to The American Metal Co., Ltd.

Treating high-speed steel for hardening. No. 2,349,767. Haig Solakian and Edward Case to Artemas Holden.

Metal composition for use in forming a sintered metallic bond for abrasive particles consisting of a mixture of chromium, copper and nickel. No. 2,349,825. Joseph Kelleher, one-half to American Optical Co., and one-half to Neveroil Bearing Co.

Electrolyte for anodic polishing of stainless steel, consisting of an aqueous solution containing orthophosphoric acid, sulphuric acid, and fluorescein dissolved in ethyl alcohol. No. 2,349,843. Glenwood Beckwith to The American Steel and Wire Co.

Workable permanent magnet alloyed composition comprising nickel, aluminum, vanadium, cobalt, copper, and the balance iron. No. 2,349,857. Oscar Finch and John White to Bell Telephone Laboratories, Inc.

Manufacturing metallic magnesium. No. 2,349,927. Tsuyoshi Arimori, Yukio Konishi, Junkichi Ishibashi and Rinnosuke Yoshimura.

Welding rod consisting of copper and containing tin, nickel and lead. No. 2,349,945. Louis Dodd to Magnus Metal Corp.

Liquidating and skimming metallurgical apparatus for refining metals and alloys. No. 2,349,972. Thomas Lister to American Smelting and Refining Co.

Electrodeposition of bright cadmium comprising electrodepositing cadmium from a cadmium cyanide plating solution containing a brown resin. No. 2,350,165. John Henricks, Jr. to The Udylite Corp.

Recovery of metal from molen oxidizing slag. No. 2,350,725. Patrick Edgar Cavanagh.

Treating tinned steel scrap containing lead. No. 2,350,918. William Norlander and Robert Alldredge, one-half to Philip Paden.

* *Continued from last month, Vol. 562, Nos. 3, 4, 5—Vol. 563, No. 1.*

*Paints, Pigments

Composition in solid form for coloring organic derivatives of cellulose, organic solvents, oils, resins, lacquers, and like. No. 2,349,282. Jean Kern to Allied Chemical & Dye Corp.

Measuring the drying and hardening properties of a paint film. No. 2,349,699. Ladislav Boor to American Cyanamid Co.

Treating carbon black for use as pigment in coating compositions which comprises applying to carbon black an inactivating compound for rendering carbon black less reactive with respect to drier compound, said inactivating compound comprising an inorganic salt of chromic acid. No. 2,350,846. Max Vogel and John Snyder to Binney and Smith Co.

Treating carbon black for use as a pigment in coating compositions which comprises applying to carbon black an inactivating compound comprising a water-soluble inorganic salt of hydrochloric acid. No. 2,350,847. Max Vogel and John Snyder to Binney and Smith Co.

*Paper & Pulp

Producing corrugated fiberboard, comprising treating at least one side of a paperboard with a sodium silicate solution. No. 2,349,698. Ernest Boller and Raymond Remler to E. I. du Pont de Nemours & Co.

Preparing transparent moistureproof materials which comprises impregnating a base sheet with composition comprising a cellulose ether, resin, and spermaceti. No. 2,350,292. John Sermattei and Cecil Rhodes to Rapinwax Paper Co.

Making corrugated paper board assemblies, which comprises treating opposite sides of a paper corrugating medium with an acid solution and a water-soluble urea-formaldehyde reaction product. No. 2,350,336. Jordan Bauer and Don Hawley to Stein, Hall Manufacturing Co.

*Petroleum Chemicals

Slushing composition containing a metal soap of preferentially oil-soluble sulfonic acids. No. 2,348,715. Elmer Adams and George Flint to Standard Oil Co.

Separation of butadiene from a C_4 hydrocarbon mixture containing isobutane, butene-1, isobutene and butadiene. No. 2,348,931. Walter Schulze to Phillips Petroleum Co.

Corrosion-inhibiting composition comprising non-gaseous hydrocarbons containing each of a polycarboxylic acid, having corrosion-inhibiting properties. No. 2,349,044. Edward Jahn to Shell Development Co.

Obtaining butane and heavier hydrocarbons from propane and ethylene. No. 2,349,053. Ernest Pevere to The Texas Company.

Polymerizing styrene in presence of substance obtained by alkylating phenol with chlorinated petroleum wax. No. 2,349,198. Orland Reiff and Alfred Kozacik to Socony-Vacuum Oil Co., Inc.

Readily flowable, oily lubricating composition for internal combustion engines, comprising mineral oil, sulphur dissolved in mineral oil, a heavy metal soap and an alcohol. No. 2,349,224. Edward Nill to The H. A. Montgomery Co.

Analyzing soil gas for hydrocarbons heavier than methane in the presence of methane. No. 2,349,250. Richard Doan, to Phillips Petroleum Co.

Extracting an olefinic component from a mixture containing olefinic and paraffinic components. No. 2,349,415. Arthur Draeger and William Franklin to Standard Oil Development Co.

Treating crude residual oils to obtain vaporizable constituents suitable for further cracking treatment. No. 2,349,428. Charles Hemminger to Standard Oil Development Co.

Production of composition composed of saturated branched chain, normally liquid hydrocarbons boiling in the gasoline range. No. 2,349,458. John Owen and Eldon Stahly to Standard Oil Development Co.

Prospecting for petroleum deposits which comprises subjecting samples of surface soil to action of hydrocarbon gas in a sealed zone. No. 2,349,472. Millard Taggart, Jr., to Standard Oil Development Co.

Petroleum fraction containing olefins is extracted with SO_2, but prior to its contact with SO_2 an oxidation inhibitor is introduced. No. 2,349,473. Richard Tannich to Standard Oil Development Co.

Converting hydrocarbon oils by action of powdered catalyst dispersed therein at high conversion temperature. No. 2,349,574. Arthur Conn to Standard Oil Co.

Converting hydrocarbon oils by action of suspended solid catalysts in vapor phase. No. 2,349,575. Vanderveer Voorhees to Standard Oil Co.

Foam prevention in drilling wells wherein a positive colloid mud fluid comprising basic dye and positively charged mineral particles is circulated in well bore, the step which comprises adding a neutral ester of high molecular weight fatty acid to the fluid. No. 2,349,585. Donald Bond and Charles Botsford to The Pure Oil Co.

Composition of matter formed by heating chlorinated petroleum wax with aromatic material of phenols and aromatic ethers with an olefin having conjugate double bonds. No. 2,349,759. Orland Reiff and John Zech to Socony-Vacuum Oil Co., Inc.

Apparatus for separating tar from hydrocarbon oils. No. 2,349,777. Ernest Utterback and William Hagerbaumer to Socony-Vacuum Oil Co., Inc.

Preparing metal salts of phenols which comprises reacting an acetylide with a phenol. No. 2,349,798. George Denison, Jr. and Arthur Ettling to Standard Oil Co. of California.

Polycarboxylic acid salts in lube oil compounding to inhibit corrosiveness of the oil. No. 2,349,817. Bruce Farrington, James Clayton and

Dorr Etzler to Standard Oil Co. of California.

Preparing catalytic materials in a catalytic process for polymerization of low-boiling olefin hydrocarbons heavier than ethylene. No. 2,349,904. Karl Hachmuth to Phillips Petroleum Co.

Separator adapted to separate suspended liquid bodies from a high pressure hydrocarbon gas stream. No. 2,349,944. Philip Dixon to National Tank Co.

Non-aqueous drilling fluid comprising mineral oil, tall oil, and a base admixed thereto, and a finely divided solid material. No. 2,350,154. Reginald Dawson and Charles Blankenhorn to Shell Development Co.

Cracking hydrocarbons by subjecting said hydrocarbons to cracking in presence of mercury and an aliphatic halide. No. 2,350,159. Hillis Folkins and Carlisle Thacker to The Pure Oil Co.

Removing weakly acidic substances from hydrocarbon liquids. No. 2,350,176. Timothy McNamara and Lawrence Henderson to The Pure Oil Co.

Ground-surface-covering comprising mineral aggregates which have been coated with an asphalt-free mineral lubricating oil which has been reacted with a sulfo compound. No. 2,350,279. Johan Hoeffelman to Shell Development Co.

Mineral oil composition comprising a mineral oil having admixed an oil-miscible substantially stable monosulfide of an alkyl-substituted hydroxyaromatic hydrocarbon. No. 2,350,368. Orland Reiff to Socony-Vacuum Oil Co., Inc.

Preparing 1,2,3,4-tetrachloro-2-methyl butane from a light oil isoprene fraction. No. 2,350,373. Frank Soday to The United Gas Improvement Co.

Producing synthetic, predominantly branched paraffins lying within motor fuel boiling range from paraffins and olefins of lower molecular weight. No. 2,350,501. Frederick Frey and Harold Hepp to Phillips Petroleum Co.

Continuous method of distilling and coking a heavy residual hydrocarbon oil. No. 2,350,507. Charles Hemminger to Standard Oil Development Co.

Conversion of hydrocarbon oils. No. 2,350,508. Charles Hemminger to Standard Oil Development Co.

Recovering furfural from admixture with furfural polymer. No. 2,350,584. Charles Buell and Carl Cooper to Phillips Petroleum Co.

Recovering polymer-free furfural from stripped lean furfural which has been employed as a selective solvent in extraction of aliphatic unsaturated hydrocarbons from hydrocarbon mixtures. No. 2,350,609. Karl Hachmuth to Phillips Petroleum Co.

Catalytically dehydrogenating a hydrocarbon mixture containing at least two paraffin hydrocarbons having at least two carbon atoms per molecule and forming a corresponding olefin mixture. No. 2,350,628. Maryan Matuszak to Phillips Petroleum Co.

Catalytic conversion of hydrocarbons by passing hydrocarbons in vapor phase through a reaction zone filled with catalyst granules. No. 2,350,730. William Degnen, Henry Nelly, Jr. and Percival Keith, Jr., to The M. W. Kellogg Co.

Mineral oil composition comprising a viscous mineral oil fraction and an antioxidant, selected from 4,4′-di-tertiarybutyl-2,2′-diamino diphenyl disulfide and 4,4′-diamyl-2,2′-diamino diphenyl disulfide. No. 2,350,746. Everett Fuller to Socony-Vacuum Oil Co., Inc.

Treating of heavy hydrocarbonaceous materials to produce lower boiling hydrocarbons which comprises destructively hydrogenating said material in presence of hydrogen chloride and alumina. No. 2,350,828. Louis Schmerling and Arthur Durinski to Universal Oil Products Co.

*Petroleum Refinery

Improvement of catalytic activity of a catalytic material which consists essentially of alumina in form of granules which have dust particles that are not removable by screening adhering thereto. No. 2,348,780. David Blaker and Maryan Matuszak to Phillips Petroleum Co.

Conversion of hydrocarbon oil by contact with a catalytic mass at elevated temperature wherein the oil heated to a conversion temperature is passed through each of two contact masses alternately. No. 2,348,794. DuBois Eastman and Charles Richker to The Texas Company.

Treating a hydrocarbon mixture to produce hydrocarbons suitable for motor fuel. No. 2,348,802. Frederick Frey to Phillips Petroleum Co.

Manufacture of anti-knock gasoline. No. 2,348,815. Francis Horton, Lebbeus Kemp and Richard Nagle and Loren Scoville to The Texas Company.

Continuous filtration of solids from a mixture of solids and mother liquor by means of a continuous rotary drum filter. N. 2,348,822. Wynkoop Kiersted, Jr. to The Texas Company.

Catalytically converting normally gaseous olefin containing hydrocarbons into a normally liquid hdrocarbon product boiling in gasoline range. No. 2,348,836. Richard Nagle to The Texas Company.

Combination cracking process. No. 2,348,867. Richard Trow to The Texas Company.

Converting paraffinic hylrocarbons boiling above lower part of gasoline boiling range into hydrocarbons of a smaller number of carbon atoms per molecule and in gasoline boiling range. No. 2,349,160. Frederick Frey and Robert Snow and Walter Huppke to Phillips Petroleum Co.

In catalytic cracking of hydrocarbon oil the improvement which comprises maintaining both cracking and regenerating zones under a total pressure in excess of two atmospheres. No. 2,349,478. Charles Tyson and Carl Tongberg to Standard Oil Development Co.

In refining of oil, apparatus for continuously indicating aniline point of the oil. No. 2,349,482. Albert Welty, Jr. to Standard Oil Development Co.

Improving a gasoline fraction of relatively low anti-knock value. No. 2,349,812. Roland Day and Elmer Kanhofer to Universal Oil Products Co.

Reforming olefinic gasoline. No. 2,349,827. William Mattox to Universal Oil Products Co.

Converting hydrocarbon oil to gasoline boiling hydrocarbons. * No. 2,350,204. Cary Wagner and Charles Ridgway to The Pure Oil Co.

Separating a narrow boiling range mixture comprising components A and B, component A having a relatively lower vapor pressure in presence of a relatively high boiling selective solvent than component B. No. 2,350,256. Russell Shiras and Mott Souders to Shell Development Co.

Isomerizing gasoline hydrocarbons present in mixtures of straight chain and cycloparaffin hydrocarbons by action of an isomerization catalyst selected from aluminum chloride and aluminum bromide in presence of hydrogen halide promoter. No. 2,350,834. Eugene Sensel and Arthur Goldsby to The Texas Co.

* *Continued from last month, Vol. 562, Nos. 3, 4, 5—Vol. 563, No. 1.*

*Photographic Chemical

Producing a corrected photographic image in a multilayer photographic material, including a light sensitive silver halide layer for each color separation image to be recorded in the material, and a supplementary light sensitive silver halide layer. No. 2,348,735. Bela Gaspar to Chromogen, Inc.

Treating bath for producing a photographic dye image in a photographic emulsion uniformly dyed with an azodye and also comprising a developed silver image. No. 2,348,894. Bela Gaspar to Chromogen, Inc.

Photo-sensitive silver halide emulsion containing a bis ammonium salt of an aliphatic amine and a bis sulfonic acid. No. 2,349,760. Earle Richardson and Jonas Chechak to Eastman Kodak Co.

Printing from a multicolored record. No. 2,350,101. Ralph Evans and Benjamin Luboshez to Eastman Kodak Co.

Photographic developing solution comprising as the developing agent a lower fatty acid acylamino-4-amino-dialkylaniline. No. 2,350,109. Wesley Hanson, Jr., to Eastman Kodak Co.

Making a sensitive tracing cloth of improved transmission which comprises treating a sized cloth with a solution containing a wax and oil transparentizing agent, coating treated cloth with a solution of gelatin and cellulose ester and applying to one side of said waterproofed cloth, a subbing layer and a gelatino-silver halide emulsion layer. No. 2,350,124. Gale Nadeau and Clemens Starck to Eastman Kodak Co.

Producing a sulphonic acid chloride of an aromatic compound containing a group from —CO—CH_2—CO— and CO—CH_2—CN. No. 2,350,127. Henry Porter and Arnold Weissberger to Eastman Kodak Co.

Nondiffusing acylacetyl sulphonamide coupler for photographic emulsion. No. 2,350,138. Arnold Weissberger to Eastman Kodak Co.

Color formers and dyes for photography. No. 2,350,380. Clayton White to E. I. du Pont de Nemours & Co.

Forming a colored image in a photographic layer containing dispersed therein a dye bleachable with a reducing bleach bath under influence of a silver image and a silver image. No. 2,350,736. George Ehrenfried to Eastman Kodak Co.

Photographic screening layer. No. 2,350,764. Edwin Jelley and Paul Vittum to Eastman Kodak Co.

Diketopyrimidine coupler. No. 2,350,812. Willard Peterson to Eastman Kodak Co.

Diazotype photographic material. No. 2,350,843. Waldemar Vanselow, Arnold Weissberger and Dudley Glass to Eastman Kodak Co.

*Resins, Plastics

Elastic waxlike plastic composition comprising a waxy body selected from high molecular weight fatty acids and waxes, solid synthetic resin soluble therein and plasticizer for said resin. No. 2,348,756. Joseph Ryan to Grace Ryan.

Method of producing protein plastics by cold molding, consisting in inserting a molded protein article in a bath comprising formaldehyde and kieselguhr. No. 2,348,761. Oswald Sturken, fifty per cent to Harriet Sturken and fifty per cent to Sidney Reich.

Fabricating vinylidene chloride polymers. No. 2,348,772. Ralph Wiley to The Dow Chemical Co.

Apparatus for preparation of catalysts by impregnation of adsorptive solids with vapors of catalytic promoters. No. 2,349,230. Samuel Thomas to Shell Development Co.

New compound, a v-aryl-v-(sulphonamido)-pimelonitrile. No. 2,349,405. Herman Bruson and Thomas Rieiter to The Resinous Products & Chemical Co.

Vinyl resin composition as a conductor for electric current electrically insulated and having high tensile strength and toughness coupled with flexibility, resiliency, high dielectric strength and resistance to cutting, abrasion and attack. No. 2,349,412. Stuart Douglas to Carbide and Carbon Chemicals Corp.

Plastic composition, a homogeneous dispersion of a vinyl resin, plasticizer and a small amount of a stabilizer, said vinyl resin being a conjoint polymer of vinyl chloride with vinyl acetate. No. 2,349,414. James Ferrer and Stuart Douglas to Carbide and Carbon Chemicals Corp.

Stabilized, pressure sensitive, adhesive composition comprising a high molecular weight polyisobutylene, a thermoplastic adhesion and tack producing resin, a nonvolatile plasticizer, and a stabilizer. No. 2,349,508. Gerry Mack to Advance Solvents and Chemical Corp.

Formaldehyde resin modified with a polyiso-or polyisothiocyanate. No. 2,349,756. Burt Pratt to E. I. du Pont de Nemours & Co.

Abrasion resistant covering on telephone wire comprising a textile fabric impregnated with a cold drawing superpolyester. No. 2,349,951. Calvin Fuller and Archie Kemp to Bell Telephone Laboratories, Inc.

Insulated telephone switchboard wire consisting of a conducting metal core insulated with a layer of organic fibrous insulating material and an outside coating of a cold drawing polyester. No. 2,349,952. Calvin Fuller to Bell Telephone Laboratories, Inc.

Producing a plastic condensation or polymerization product comprising refluxing hexadecane dicarboxylic acid with hydrazine hydrate. No. 2,349,979. Otto Moldenhauer and Helmuth Bock.

Resinous condensation product formed by heating a mixture containing para-hydroxy benzoic acid and a polyhydric alcohol. No. 2,350,326. Russell DuVall and Ernest Grether to The Dow Chemical Co.

Compressed plywood structure comprising alternate impregnated and unimpregnated wood plies, the impregnated plies containing a polymerisable resin. No. 2,350,729. Marcel Francois Crouet.

*Rubber

Non-blooming rubber hydrohalide structure elasticized with a mixture of a phthalate from the alkyl and alkoxy-alkyl esters of phthalic acid and an ester of a dicarboxylic acid. No. 2,349,036. George Ferner to Wingfoot Corp.

Improving the adhesion of nylon to rubber. No. 2,349,290. Dwight Loughborough to The B. F. Goodrich Co.

Preserving freshly-collected latex which comprises treating latex with ammonia and adding a nitro derivative of an aromatic compound. No. 2,350,294. William Stewart to The B. F. Goodrich Co.

Cyclized rubber containing basic amino polymers. No. 2,350,385. William Charch to E. I. du Pont de Nemours & Co.

*Textile

Preparing a laminating fabric for adhesively uniting the components of a composite fabric No. 2,348,781. Joseph Bludworth to Celanese Corp. of America.

Setting a fabric article fabricated from a yarn essentially a synthetic linear condensation polyamide. No. 2,350,021. George Dunn to Paramount Textile Machinery Co.

Treating textile material, which comprises impregnating with a softening agent consisting of trimethylammonium sulphate of monstearyl-paraphenylenediamine and with a crease-proofing agent of a hardenable condensation product of formaldehyde and melamine. No. 2,350,139. Gustav Widmer and Willi Fisch to Ciba Products Corp.

**Water, Sewage & Sanitation*

System for treating sewage. No. 2,349,390. Samuel Tolman to The Jeffrey Manufacturing Co.

Agricultural Chemicals

Method and composition of growing plants with solutions. No. 2,350,982. Theodore Borst to Samuel Meek.

Manufacturing animal feed from superphosphates, the step of calcining superphosphate to remove sulphur. No. 22,500. Mark Shoeld to The Davison Chemical Corp.

Cellulose

Stabilizing a cellulosic fabric against changes in dimensions, by impregnating said fabric with a solution of a quarternary oxymethyl ammonium compound. No. 2,351,581. Louis Bock and Alva Houk to Rohm & Haas Co.

Stabilizing lower fatty acid esters of cellulose containing bound acid components. No. 2,352,022. Aladar Schuller and Remi-Gustaaf Tritsmans.

Preparing dicarboxylic acid esters of cellulose derivatives. No. 2,352,261. Gordon Hiatt and John Emerson to Eastman Kodak Co.

Clarifying fouled regenerating baths from regeneration of hydrated cellulose from viscose, which baths contain sulfur deposited out of solution, which consists of subjecting bath to flotation by passing an inert gas through bath in presence of a non-ionogenic surface active compound. No. 2,352,519. Joseph Costa and William Kahler to Manville Jenckes Corp.

Ceramics

Super-duty silica refractory brick. No. 2,351,204. Frederic Harvey and Raymond Birch to Harbison-Walker Refractories Co.

Vitreous enamel composition suitable for enameling electrical resistors which comprises: lead oxide; silica; boric oxide; alumina; and ferric oxide. No. 2,351,252. Alden Deyrup to E. I. du Pont de Nemours & Co.

Claybase adsorbent for decolorizing comprising fired but non-vitrified granules of clay having distributed uniformly therethrough carbon and a water-insoluble basic calcium phosphate. No. 2,352,932. Elliott Barrett and James West.

* *Continued from last month, Vol. 562, Nos. 3, 4, 5—Vol. 563, No. 1.*

Preparing fritted foundations for enameling of metallic articles. No. 2,351,811. Karl Frank.

Silvering the surfaces of ceramic ware by firing which comprises a flux, a solvent vehicle, silver, and a compound of a heavy metal. No. 2,351,974. Max Kollmar.

Lead-free, vitrifiable ceramic glaze composition for decorating glassware and maturing below 1150° F. to a glossy decorative surface coating. No. 2,352,425. Alden Deyrup to E. I. du Pont de Nemours & Co.

Heat cast refractory for molten glass consisting of zirconia and at least one of the alkalies Li_2O, Na_2O and K_2O. No. 2,352,530. Gordon Fulcher and Theodore Field to Corhart Refractories Co.

Chemical Specialties

Binder for roadmaking consisting of rosin, soya bean oil and anthraquinone oil, adding calcium oxide. No. 2,350,977. Carl Agthe to J. R. Geigy A. G.

Adhesive paste for labeling bottles, comprising water, casein, an organic amide, a zinc compound, and an alkaline solvent. No. 2,351,109. John Corwin and Robert White to The Borden Co.

Finger nail enamel remover composition in cream-like form consisting of anyhdrous organic solvent portion capable of dissolving nitrocellulose and the remainder comprising a mixture of a solid fatty acid from stearic and palmitic acids, ethyl cellulose, a cosmetic aid from castor oil, olive oil and lanolin, and concentrated aqua ammonia. No. 2,351,195. Alfred Dreyling to E. I. du Pont de Nemours & Co.

Lubricant comprising an alkyl benzoate as a base lubricant and a lithium soap blended therewith to produce a stable grease. No. 2,351,280. John Morgan to Cities Service Oil Co.

Rinsing alkali soap from washed fabric in a rinsing bath containing a metallic salt of a character so as to react with alkali soap to form an insoluble metallic soap. No. 2,351,295. Albert Schellenberg.

Adhesive paste for labeling bottles, containing water as its largest component, casein, an organic amide, a zinc compound and a water soluble alkaline solvent. No. 2,351,309. Robert White to The Borden Co.

Mothproofing composition adapted to evaporate its water on a woolen and deposit substantially pure salicylic acid as sole mothproofing agent and also deposit a substantially imperceptible resin and plasticizer. No. 2,351,359. Henry Mitchell to M. H. Hoepli.

Anti-ring-sticking lubricant comprising a mineral lubricating oil and dissolved an oil-soluble aluminum salt of an alpha-aromatic amino monocarboxylic acid. No. 2,351,380. Ellis White to Shell Development Co.

Lithium soap grease. No. 2,351,384. Harold Woods and Jacobus Plantfeber to Shell Development Co.

Machine for manufacturing butter, from cream and milk, in presence of CO_2. No. 2,351,458. James Senn.

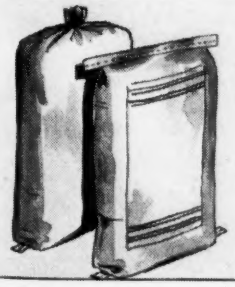
Inhibiting internal corrosion in a ferrous metal container in contact with light liquid petroleum distillates comprising subjecting interior of container to inhibiting action of a solution of an alkal metal nitrite. No. 2,351,465. Aaron Wachter to Shell Development Co.

Printing ink for letter press work, consisting of partially polymerized synthetic urea formaldehyde resin dissolved in non-aqueous solvent and pigment. No. 2,352,659. Harvey Seil and Herbert Cole to Wm.

You, no doubt, have bought your full share of War Bonds. You have fulfilled your present obligation to your fellowmen and Country, however, the War still goes on . . . victory is still to be won . . .

You must buy and keep buying more Bonds.

You must join the list of Americans on fighting fronts and home fronts who are giving above and beyond the call of duty.



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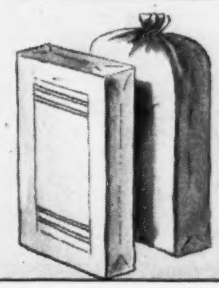


Frankel and Jacob Fox, as trustees.

Lubricant comprising a mineral lubricating oil having dissolved therein an oil-soluble detergent normally tending to promote scratching or scuffing of pistons and an oil-soluble allophanate. No. 2,352,669. Paul Van Ess and Ellis White to Shell Development Co.

Graining ink for intaglio offset application, comprising coloring matter dispersed in vehicle consisting of an alkyd resin and a solvent therefor. No. 2,352,810. Raymond Swain to Interchemical Corp.

Hard, block grease for lubrication of driving journals prepared from fatty material, caustic soda, oil-soluble metal sulfonate derived from petroleum oil and mineral oil. No. 2,352,811. Reuben Swenson to Standard Oil Co.

Extreme pressure lubricant. No. 2,352,818. William Whittier and Joseph Stucker to The Pure Oil Co.

Container into which hot fluid bituminous material is to be poured and allowed to harden having a coating on inside comprising glycerine, cellulose acetate, and toluene sulfonamide-formaldehyde resin. No. 2,352,865. Harry Smith.

Preparation of odorless and tasteless fat-soluble vitamin-containing materials. No. 2,353,011. Loran Buxton to National Oil Products Co.

Pavement comprising as supporting substructure a fibrous material which has been impregnated with a metallic stearate and a top wearing surface of bituminous material. No. 2,353,027. Henry Goodwin to Standard Oil Development Co.

Shampoo comprising a sulphated monoethanolamide of a mixture of caproic, caprylic and capric acids. No. 2,353,081. Edwin Robinson and Gifford Davis to National Oil Products Co.

Insecticidal composition comprising an emulsifiable mineral oil insecticidal material and a saturated aliphatic ketone. No. 2,351,583. Clifford Boissonou and Wallace Yates to Shell Development Co.

Thermo-fluid printing ink consisting of coloring pigment incorporated in a normally solid vehicle, said vehicle consisting of hard thermo-plastic cumarone resin, gilsonite and hydrogenated soya bean oil. No. 2,351,585. Frank Breyer to J. M. Huber, Inc.

Cementitious material. No. 2,351,641. William Sohl and Henry Stephens to Minnesota Mining & Mfg. Co.

Lubricant comprising a mineral oil containing corrosion and oxidation inhibiting amounts of an oil-soluble dimorpholine polysulfide. No. 2,351,657. Alfred Bayes to Carbide and Carbon Chemicals Corp.

Stencil sheet consisting of a thin sheet of Yoshine paper impregnated with rubber hydrochloride to form a thin structureless composite non-plastic frangible and stencilizable film. No. 2,351,696. Wallace Nichols to Rodic Rubber Corp.

Imparting a permanent configuration to hair comprising treating hair with a soluble sulfite and thereafter treating hair with an oxidizing agent to oxidize the remaining sulfite. No. 2,351,718. John Speakman.

Electrically insulating filling composition for bushings comprising inorganic insulating solid particles and a liquid compound comprising a petroleum asphalt, a chlorinated diphenyl and a petroleum oil. No. 2,351,964. Charles Hill to Westinghouse Electric & Mfg. Co.

Washing agent and detergent capable of operating in hard water without forming insoluble lime soaps, comprising water-soluble alkali lignin and soap. No. 2,352,021. Ernst Schubert, and Heinz Pierer.

Insecticidal composition. No. 2,352,078. Gerald Coleman and Clarence Moyle to The Dow Chemical Co.

Insecticidal composition. No. 2,352,079. Gerald Coleman and Clarence Moyle to The Dow Chemical Co.

Tissue filler for corpses comprising nitrocellulose, methanol, formaldehyde solution, glycerine, jasamin, chypre, and eosine dye. No. 2,352,099. George Hobdell.

Lubricant comprising a waxy mineral lubricating oil, a synthetic pour depressor, and a natural pour sensitizer extracted from a crude petroleum distillation bottoms by clay treating. No. 2,352,213. Eugene Lieber and Martin Sadlon and Aloysius Cashman to Standard Oil Development Co.

Depilatory for removing human hair from body, comprising a preparation containing a non-depilating vehicle carrying a mercapto-carboxylic acid, and an excess of an alkaline reacting material. No. 2,352,524. Ralph Evans, and Everett McDonough to Sales Affiliates, Inc.

Making composite boards. No. 2,352,553. Victor Lefebure to Imperial Chemical Industries Limited.

Coatings

Making highly glazed film coatings. No. 2,350,987. William Collings to The Dow Chemical Co.

Coated material characterized by having an improved bond between fabric base and the coating applied thereto. No. 2,351,174. William Whitehead to Celanese Corp. of America.

Forming a coating on a surface of an article. No. 2,351,536. Harold Osterberg and Rudolf Luneburg to Spencer Lens Co.

Apparatus for producing a coating of controlled thickness on surface of an article. No. 2,351,537. Harold Osterberg and Rudolf Luneburg to Spencer Lens Co.

Manufacture of calcium carbonate-adhesive coatings. No. 2,351,683. Ausker Hughes, H. Browne, and H. Roderick to Wyandotte Chem. Corp.

Coating composition, a liquid suspension of solid particles of a solid fusible resin in a mixture of water and liquid reactive resin miscible therewith. No. 2,351,716. Robert Smith to The Carborundum Co.

Refracting surface and a reflection reducing coating having a thickness of one quarter wavelength of light for which maximum reflection reduction is to be produced and consisting of evaporated and deposited gearksutite. No. 2,352,085. Glenn Dimmick to Radio Corp.

Dyes, Stains

Water-soluble dyestuff consisting of a phthalocyanine molecule coupled by azo bridges onto azo-coupling components. No. 2,351,118. Norman Haddock to Imperial Chemical Industries Limited.

Dyestuffs of the phthalocyanine series. No. 2,351,119. Norman Haddock to Imperial Chemical Industries Limited.

Monoazo dyestuff. No. 2,351,133. Arthur Knight to Imperial Chemical Industries Limited.

Producing fast dyeings which comprises applying to fiber a compound of aromatic and heterocyclic series which contains in molecule an amino group capable of being diazotized, and a member of amino and hydroxyl groups. No. 2,352,701. Erich Fischer, Werner Kirst, and Walter Gmelin to General Aniline & Film Corp.

Acid wool dyestuffs. No. 2,352,752. Werner Zerweck and Ernst Heinrich to General Aniline & Film Corp.

Equipment

Apparatus for purifying liquids. No. 2,351,053. Fred Klett to Moritz Gaertner.

Grating spectrograph. No. 2,351,457. William Rust, Jr. and Marion Arthur to Standard Oil Development Co.

Terminal for vacuum-type furnaces. No. 2,351,490. Hugh Cooper, one-half to Frank Wilson.

Apparatus for quantitatively determining percentages of gaseous unsaturated and saturated hydrocarbons in a gaseous mixture. No. 2,351,532. Wallace McMillan to The Texas Co.

Polarimeter apparatus. No. 2,351,539. William Peck to Spencer Lens Co.

Fluid flow indicating and measuring means. No. 2,352,607. Morton Alperin.

Fluid dispensing system. No. 2,352,627. Harry Grant, Jr. to Specialties Development Corp.

Fluid distribution and control apparatus. No. 2,352,629. Donald Griswold to Clayton Manufacturing Co.

Liquid level control apparatus. No. 2,352,630. Donald Griswold to Clayton Manufacturing Co.

Grading machine comprising measuring means for detecting changes of thickness of articles moving thereto in terms of variations of an electrical value. No. 2,352,650. Arthur Metcalf to North American Holding Corp.

Producing a discharge electrode. No. 2,352,651. Archibald Meston to Research Corp.

Supply and delivery of liquid under pressure. No. 2,352,680. Lindley Robertson Armitage.

Apparatus for applying plastic coatings. No. 2,352,749. Barton Wills to Lock Joint Pipe Co.

Apparatus to be disposed in a body of liquid for diffusing gas into the liquid and for circulating the liquid. No. 2,352,767. George Booth and Mitchell Cubberley to Wallace & Tiernan Co., Inc.

Apparatus for purifying liquids. No. 2,352,772. George Darby to The Dorr Co., Inc.

Deriving gaseous carbon dioxide or like gas from an insulated reservoir holding such material in solid form. No. 2,352,775. Joseph Dittmer to National Lead Co.

Apparatus for sterilizing interiors of empty vessels. No. 2,352,787. Clifford Brunswick Harley, one-half to Robert Powley & Sons Limited.

Magnetic field control of heterogeneous catalysts. No. 2,352,791. Orus Krumboltz.

Heat transfer system for transferring cooling from a source of refrigeration to a higher elevation. No. 2,352,798. Cary Miller to Servel, Inc.

Cleaning oil lines and like which consists in introducing coarse salt crystals into a body of oil flowing in the line to impinge against accumulations of paraffin. No. 2,352,805. Leonhard Scheuermann and Gabriel Pecot.

Feed device for powdered material. No. 2,352,809. William Strauss to F. J. Stokes Machine Co.

Apparatus for determining relative resistance to fluid flow offered by porous material. No. 2,352,835. Kenneth Hertel to University of Tennessee Research Corp.

Determining physical factors related to resistance to fluid flow offered by a confined mass of porous material. No. 2,352,836. Kenneth Hertel to University of Tennessee Research Corp.

Machine for dyeing textile fabrics. No. 2,352,882. Alexander Belokopytoff to Paul Robins.

Apparatus for treating water. No. 2,352,901. William Klein to Medford Engineering Co.

Chemically heated liquid container for heating preparations for treating the hair and skin. No. 2,352,951. Andrew Geria.

Apparatus for and method of separating mixed materials. No. 2,352,972. Walter Remick.

Clarification and cooling of fluids. No. 2,353,038. John Jackson to Corning Glass Works.

Retort for burning solid fuel uniformly and without formation of coke deposits. No. 2,353,087. Clark Scholl and Delmond Getz to The Steel Products Engineering Co.

Pressure release device. No. 2,353,093. Richard Tryon to Standard Oil Development Co.

Apparatus for proportioning a solution into a liquid in a receptacle as the liquid level therein rises. No. 2,351,579. Arnold Beckman to National Technical Laboratories.

Apparatus for proportioning a solution into a liquid in a receptacle as the liquid level therein rises. No. 2,351,580. Arnold Beckman to National Technical Laboratories.

Corrosion testing element. No. 2,351,644. Samuel Talley and Leo Grenot to Shell Development Co.

Hydrogen ion exchange apparatus. No. 2,351,648. Fred Whitlock to Automatic Pump & Softener Corp.

Washing of filter bags. No. 2,351,652. Arvid Anderson to Bethlehem Steel Co.

Rotary kiln plant for the heat treatment of raw materials of different kinds, particularly for the burning of cement, alkaline earth carbonate, magnesite, dolomite and the like. No. 2,351,677. Hans Gygi.

Pressure-responsive device adapted to respond to a pressure difference (P_1—P_2) and to establish another pressure whose value is proportional to the (nth) power of (P_1—P_2) where "n" may be greater or less than unity. No. 2,351,745. Robert Donaldson to John Hopwood.

Apparatus for obtaining a sample of fluid from a high pressure flowing well and separating its liquefiable hydrocarbon content. No. 2,351,764. Henry Jarrett, one-half to W. O. Whiteside.

Starch digester. No. 2,351,907. Herbert Beede to Pantex Pressing Machine, Inc.

Producing a pattern having a wooden core member coated with cellulose butyrate dissolved in highly volatile solvents. No. 2,351,919. Elvin Bright to Plastic Veneering, Inc.

Heat consumption meter of evaporation type. No. 2,351,920. Oscar Brun.

Distilling apparatus. No. 2,352,069. Walter Beline.

Immersion type conoscope for examining crystals. No. 2,352,072. Walter Bond to Bell Telephone Laboratories, Inc.

Apparatus for gauging the height of bottles or other articles. No. 2,352,091. William Fedorchak and Albert Jackson to Owens-Illinois Glass Co.

Swift working closure. No. 2,352,192. Fred Gasche to Struthers Wells Titusville Corp.

Removing and cooling a continuous film of material after severance from the surface of a revolving heated drying drum by a knife. No. 2,352,195. Guy Harcourt and Charles Lavett to Buffalo Foundry & Machine Co.

Thermostatic valve. No. 2,352,203. Roger Johnson.

Making contact with the mother copper and with one oxide surface of a copper-cuprous oxide rectifier element which has been oxidized on both sides. No. 2,352,283. Ralph Overholt, Jr. to The Union Switch Co.

Liquid filtering unit. No. 2,352,300. Earl Walker and Foster Buck to International Harvester Co.

Pressure measuring device. No. 2,352,302. Lloyd Young to Radio Corp. of America.

Continuous filter. No. 2,352,303. Frank Young.

Preventing accumulation of foam on surface of liquid exacuated from a filter. No. 2,352,304. Frank Young.

Self-contained temperature recording instrument. No. 2,352,333. William Lukens.

Rotary drum filter. No. 2,352,340. Harold Oswald to Oliver United Filters, Inc.

Air filter drip tube dispensing unit in combination with a container having sterile injection solution. No. 2,352,349. John E. B. Shaw.

Pressure leakage gauge. No. 2,352,350. William Smith.

Discharging a fire extinguishing medium, comprising conducting liquid carbon dioxide to a region of release permitting sudden expansion of the liquid to produce snow and vapor. No. 2,352,399. Leonard Myers to Cardox Corporation.

Gas heated steam or vapor heating condenser unit. No. 2,352,402. William Payne.

Ore reduction apparatus. No. 2,352,418. Harry Twiford.

Apparatus for separating asphaltic constituents from petroleum oils diluted with a deasphalting solvent in which diluted oil mixture is subjected to settling for gravity separation of asphalt, an improved settling chamber of the vertical type. No. 2,352,513. David Brandt to Cities Service Oil Co.

Producing low temperature refrigeration which includes liquefying a mixture of ethane and propane. No. 2,352,581. Joseph Winkler.

Apparatus for controlling ratio of flows of two fluids through conduits. No. 2,352,584. Herbert Ziebolz and John Vaaler to Askania Regulator Co.

Explosives

Oil well explosive composition comprising a liquid explosive nitric ester and an organic base having a dissociation constant lower than 1×10^{-5}. No. 2,351,468. Clifford Woodbury to E. I. du Pont de Nemours & Co.

Funnel for molten explosives. No. 2,352,207. Thomas Knight and Frederick Tregenza.

Fine Chemicals

Sensitizer for blueprint papers and like, containing a ferrocyanide salt, a ferricyanide salt, a light-sensitive ferric compound, and non-pigment-forming substances. No. 2,350,991. Clyde Crowley and George Goodyear to The Huey Co.

Glycerine aryl methyl diethers. No. 2,351,024. Theodore Evans and Kenneth Marple to Shell Development Co.

Preparation of aryl ethers of trihydric alcohols. No. 2,351,025. Kenneth Marple and Theodore Evans to Shell Development Co.

Making heterocyclic nitrogen-containing compounds comprising reacting lithium derivative of quinaldine with anhydride of an aliphatic acid, and hydrogenating reaction product. No. 2,351,069. William Ruigh to Merck & Co., Inc.

Bismuth-containing derivative of trihydroxy glutaric acid and process of making it. No. 2,351,161. Alvah Taylor and Kruger Wallen.

Primary amino-benzene in which a substituent group meta to $-NH_2$ is a chloro-aliphatic group having two nuclear carbons. No. 2,351,247. Victor Weinmayr to E. I. du Pont de Nemours & Co.

6-(p-Aminobenzene sulphonyl)-amino-2:4-dimethylpyrimidine and its manufacture. No. 2,351,333. Hans Gysin to J. R. Geigy A. G.

Converting a tribalopropionyl halide from class consisting of chlorine and bromine derivatives to corresponding dihaloacrylyl halide. No. 2,351,-346. Joy Lichty to Wingfoot Corporation.

Manufacturing 1, 3-isoquinolinediols. No. 2,351,391. Herman Bergstrom and Walter Wirth to E. I. du Pont de Nemours & Co.

Fermenting concentrated solutions of gluconic acid and salts. No. 2,351,500. Andrew Moyer to Claude R. Wickard, Secretary of Agriculture of the United States of America.

Preparation of beta-alkoxy monocarboxylic acids. No. 2,352,641. Frederick Kung to The B. F. Goodrich Co.

A delta 16-unsaturated-20-keto-pregnene substituted in rings A and B at C-3 and one of C-2 and C-6 by two hydroxyl groups. No. 2,352,848. Russell Marker to Parke, Davis & Co.

Preparing arylaminoanthraquinone compounds in which the arylamino radical is an amino-diphenyl-methane group. No. 2,353,041. David Klein to E. I. du Pont de Nemours & Co.

Preparing 6-Bz-1-dibromobenzanthrone wherein crude bromination product is suspended in an organic solvent. No. 2,353,049. Henry Lee and Clarence Belcher to E. I. du Pont de Nemours & Co.

Preparing quinones. No. 2,351,715. Lee Smith to Regents of the University of Minnesota.

Esters of a carbocylic-substituted aliphatic carboxylic acid and an N (alkyl, -beta-4-morpholyalkyl) animoalkanol. No. 2,351,833. Elmore Northey and Martin Hultquist to American Cyanamid Co.

Preparing nitrate esters of 1,3-dialkyl-7-hydroxymethyl xanthines, which comprises causing silver nitrate to react upon a 1,3-dialkyl-7-chloromethyl xanthine. No. 2,351,843. John Speer to G. D. Searle & Co.

Nitrate and nitrite esters of 7₁-hydroxy-8-chlorocaffeine. No. 2,351,844. John Speer to G. D. Searle & Co.

Apparatus for storing and preserving material containing vitamins or carotene. No. 2,351,853. William Graham, Jr. to American Dairies, Inc., and The Quaker Oats Co., jointly.

Azo derivatives of sulphones and a method of making the same. No. 2,351,936. Max Dohrn and Otto Laubereau to Schering Corp.

Producing lactams. No. 2,351,939. Otto Drossbach and Karl Huttner.

Addition compound, composed of pyridine-B-carboxylic acid diethylamide and sulphanilamide. No. 2,352,012. Johann Rosicky.

Analgetically active substances the 6-methoxy-1-hydroxy-2-N-piperidyltetrahydronaphthalenes. No. 2,352,020. Georg Scheuing and Bruno Walach.

Oxazolidine compounds. No. 2,352,152. Saul Kaplan to The Richards Chemical Works.

Facilitating growth of mold of species Aspergillus oryzae on solid substrates of carbohydrates of fibrous character. No. 2,352,168. Leo Christensen to National Agrol Co., Inc.

2-allyl-1,4-naphthoquinone, an antihemorrhagic compound. No. 2,352,-528. Louis Fieser to Research Corp.

Industrial Chemicals, Inorganic

Composition flooring non-productive of sparks including in its construction calcined magnesite and finely divided coke mixed with liquid magnesium chloride. No. 2,351,022. William Donelson and John Downey to The Federal Flooring Corp.

Modifying catalytic properties of dried and reduced unglowed chromium oxide, which comprises subjecting said catalyst to action of solution of a water-soluble alkaline compound selected from alkali and alkaline-earth metals. No. 2,351,094. David Blaker to Phillips Petroleum Co.

Zeolite regenerating compound for use in salt brine consisting of solution of sodium bicarbonate, potassium carbonate, trisodium phosphate, sodium metaphosphate and caustic soda. No. 2,351,160. Norman Stone and Samuel Holliday to The Dacar Chemical Products Co.

Preparing anhydrous sodium orthosilicate in a single heating step. No. 2,351,385. Eduard Zintl.

Recovering anhydrous hydrogen chloride comprising contacting aqueous hydrogen chloride with sulfuric acid in presence of low boiling paraffinic hydrocarbon. No. 2,351,461. Delmas Smith and William Franklin to Standard Oil Development Co.

Treating waste solutions of caustic soda containing sulphur compounds obtained in treating hydrocarbon distillates. No. 2,352,594. Joseph August, Jr. to The Standard Oil Co.

Manufacture of alkali metal silicates. No. 2,352,738. Robert Ruthruff.

Molded body of alpha aluminum trihydrate comprising plurality of particles of alpha aluminum trihydrate bonded together by additional alpha aluminum trihydrate. No. 2,352,867. Vernon Stowe to Aluminum Co. of America.

Conditioning a copper plate for adherence of an alloy of lead, tin and antimony which consists in subjecting plate to a bath consisting of water, zinc chloride, and ortho-phosphoric acid. No. 2,352,905. Axel Lundbye to The Crowell-Collier Publishing Co.

Forming solution containing basic lead styphnate, normal lead styphnate and lead hypophosphite and causing materials to react to form a complex salt containing basic lead styphnate, normal lead styphnate and lead hypophosphite. No. 2,352,964. Joseph McNutt and Samuel Ehrlich to Western Cartridge Co.

Fused bath for cleaning ferrous metal articles to remove metal oxides which comprises molten sodium hydroxide having sodamide and sodium hydride dissolve therein. No. 2,353,026. Harvey Gilbert to E. I. du Pont de Nemours & Co.

Producing magnesium bisulphite liquor by absorption of sulphur dioxide from gases. No. 2,351,780. George Palmrose to Weyerhaeuser Timber Co.

Treating ores containing lead and zinc in the form of carbonates and sulfides. No. 2,351,795. Charles Wood to Los Angeles Chemical Co.

Regenerating spent adsorbent particles of clay-type contact material, contaminated with carbonaceous impurities by burning off impurities with air. No. 2,351,875. John Payne to Socony-Vacuum Oil Co., Inc.

Recovering alumina from aluminous raw materials. No. 2,351,941. Walter Dyckerhoff and Wilhelm Wittekindt.

Improving an alkalia metal salt of rosin. No. 2,351,949. Edmund Georgi to Hercules Powder Co.

Production of magnesium oxide of high chemical reactivity. No. 2,351,-998. Wilhelm Oschel and Willi Forst and Walther Schmid.

Fluorescent screen of luminescent material having characteristic that when subjected to ion bombardments it is resistant to formation of dark spots, said material consisting of zinc sulfide and cadmium sulfide. No. 2,352,035. Heinrich Strubig and Walter Hass.

Producing partially azotized disintegrated calcium carbide. No. 2,352,051. Rudolf Wendlandt, Gerhard Hoffmann, and Hans Fuldner.

Purifying feldspathic and similar minerals containing magnetic constituents. No. 2,352,324. William Hubler to American Nepheline Corp.

Industrial Chemicals, Organic

Separating a lower acetylenic hydrocarbon from a mixture comprising same and propylene. No. 2,350,984. Edgar Britton and Myron Huscher to The Dow Chemical Co.

Making 2,2,3 trichloro and tribromo-alkanal-1 compounds and the hydrates thereof. No. 2,351,000. Ralph Brown and Ralph Plump to The Pennsylvania Salt Manufacturing Co.

Producing a uniform mixture of a liquid and a gas. No. 2,351,072. Hermann Schmidt to The Universal Royalty and Development Co.

Making alkali metal metallophenylmalonic esters which comprises reacting a phenylmalonic ester with an alkali metal alcoholate in presence of a dialkyl carbonate. No. 2,351,085. Vernon Wallingford and August Homeyer to Mallinckrodt Chemical Works.

Preparing hydrocarbons for polymerization. No. 2,351,123. Harrison Hays and Joseph Maher to Phillips Petroleum Co.

Purifying aliphatic nitriles to remove hydrogen cyanide. No. 2,351,157. Waldo Semon to The B. F. Goodrich Co.

Removal of oxygen from normally gaseous olefins. No. 2,351,167. Virgil Ware to E. I. du Pont de Nemours & Co.

Making a carbazole which comprises heating a mixture comprising an ortho-amino-diphenyl and an organic nitro-substituted compound. No. 2,351,171. Viktor Weinmayr to E. I. du Pont de Nemours & Co.

Refining a vegetable oil containing gums in which a sufficiently high temperature of the aqueous oil mixture is employed to coagulate the gums. No. 2,351,184. Paul Boone.

Reduction of organic compounds which comprises reacting a mixture of saturated hydrocarbon sulfonyl chlorides free from aromatic groups with a strong reducing agent and recovering a mixture of mercaptans. No. 2,351,196. Arthur Fox to E. I. du Pont de Nemours & Co.

Catalytic cracking of hydrocarbon oil vapors at 350° to 650° C. while using a catalyst in piece form, which must from time to time be regenerated. No. 2,351,214. Hermann Kaufmann and Rudolf Keinke.

Bituminous road constructional materials comprising a bituminous binding agent and a stone material and a sulfonamide having the nitrogen atom substituted by an aliphatic chain to which is attached a terminal amino group. No. 2,351,241. Heinrich Ulrich, Ernst Ploetz, and Oskar Ferrares.

Production of hydrocarbons having more than one carbon atom in molecule by catalytic conversion of carbon monoxide with hydrogen in a plurality of consecutive reaction vessels. No. 2,351,248. Gustav Wirth, Franz Sabel, and Hans Laudenklos.

Treating a mixture of saturated and unsaturated fatty acids including low boiling saturated fatty acids and high boiling highly unsaturated fatty acids, to obtain a high yield of highly unsaturated fatty acids. No. 2,351,249. Albert Zeigler, Dale Stingley and James Kiefer to Armour & Co.

Recovering a water-soluble alkali metal salt of a carboxyalkyl cellulose in readily filterable form from an aqueous solution. No. 2,351,258. Richard Freeman and Robert Anthonisen to The Dow Chemical Co.

Additional patents on medicinals, metals, alloys, paints, paper, petroleum chemicals, refining, resins, plastics, rubber, textiles, water sewage and sanitation from above vols. will be given next month.

Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those interested in obtaining further information concerning the patents reported below should communicate with the Patent Department, CHEMICAL INDUSTRIES. Photostated copies of Canadian patents are available from the Commissioner of Patents, Ottawa, Canada.

CANADIAN PATENTS

Granted and published February 22, 1944. (Continued)

Blocking layer rectifier and cooling plate. No. 418,628. Cornelius de Lange, Chas. Louis Boucher.

Manufacture of perforated ceramic plate by punching and sintering. No. 418,635. Leonardus Theodorus Scheerman.

Piezo electric pressure indicator. No. 418,636. Willem Hendrik Stigter.

Granted and Published February 29, 1944.

Electric dry cell manufacturing method. No. 418,646. Jean Cogan.

Antiseptic ointment comprising hydrogenated castor oil with admixed medicament. No. 418,649. Geo. Wm. Fiero.

Water soluble non hygroscopic preparation consisting of monohydrated sodium perborate, sodium chloride, and catalytically small amount of potassium iodide. No. 418,660. Nicholas M. Molnar.

Tubular ore concentrator. No. 418,664. Augustus Peddlesden.

Ion exchange resin. No. 418,691. Dominion Rubber Co. Ltd. (D. M. Findlay).

Permanent magnetic alloy. No. 418,738. Philips Lamps Ltd. (G. B. Jonas).

Receptacle filling machine. No. 418,743. Robin Hood Flour Mills Ltd. (John W. McCaslin).

Method of producing a powdered thermoplastic resin, comprising mixing boric acid with a thermoplastic containing plurality of aliphatic hydroxyl groups per molecule, to produce a non-plastic, grindable material, capable of being freed from boric acid by leaching and reassuming plastic nature. No. 418,746. Shawinigan Chemicals Ltd. (Ernest Paul Irany).

Process for the preparation of very finely divided sodium bicarbonate by alcoholic precipitation from aqueous solution. No. 418,801. Walter McGeorge, Francis Highland Milner.

Cellulose derivative manufacture by treatment halogenated lower fatty acid cellulose ester with a dinitrile or butadiene dioxide. No. 418,804. Henry Dreyfus.

Air compressor design. No. 418,820. Edward Cecil Mills.

Method of forming a material for taking dental impressions by admixture of calcium sulphate and aqueous solution of an alginate to form a stiff, elastic gel. No. 418,834. The Amalgamated Dental Co. Ltd. (S. W. Wilding).

Production of coloured titanium pigments by calcination of titanium oxide with cobalt, nickel, or chromium compounds. No. 418,851. Canadian Industries Ltd. (H. H. Schaumann).

Preparation of white pigments by calcination of mixture of anatase and zinc oxide until X-ray examination reveals substantial rutile content. No. 418,852. Canadian Industries Ltd. (Jas. E. Booge).

Removal of impurities from tianium dioxide, by sulphuric acid digestion, filtration, and calcination. No. 418,853. Canadian Industries Ltd. (R. K. Whitten).

Method for the preparation of pigment composed of rutile and thermally produced zinc oxide-tianium oxide combination. No. 418,858. Canadian Titanium Pigments Ltd. (S. S. Cole, Walter K. Nelson).

Production of alkali-resistant alginic textiles whereby an alkali alginate solution is spun into beryllium salt coagulant. No. 418,866. Cefoil Ltd. (J. B. Speakman, N. H. Chamberlain).

An austenitic chromium-nickel steel alloy. No. 418,882. Firths-Vickers Stainless Steels Ltd. (Wm. H. Hatfield).

A method of partitioning soap by soap crystal rearrangement. No. 418,890. Lever Brothers Ltd. (John W. Bodman, F. F. Pease).

Plastic putty-like asphalt composition suitable for joint sealing comprised of brown asphalt, paraffinic hydrocarbon, and filler. No. 418,921. Shell Development Co. (Jacob van der Berge).

Metallic carboy crate. No. 418,943. Carrier Stephens Co. & Union Steel Products Co. (John A. Martin, Leonard E. Butters).

Manufacture of acidyl cellulose derivative. No. 418,945. Henry Dreyfus, Robt. W. Moncrieff, & Harold Bates.

Removal of oxide scale from metals by subjecting metal as cathode to electrolysis in fused sodium salt bath. No. 418,953. Urlyn Clifton Tainton.

Sugarification of wood, straw or other hexosane or pentosane containing materials by pressure hydrolysis with circulated Olli Viljo Ant-Wuorinen sulfur dioxide solution. No. 418,956.

Granted and Published March 14, 1944.

Cardboard box lining and packing box design. No. 418,965. Chas. A. Briggs.

Waterproofing textiles by treatment with wax-albumen emulsion with subsequent heat-fatty acid coagulation. No. 418,974. Eric Berkeley Higgins.

Waterproofing textiles by developing insoluble waterproofing complex within the fibre by impregnation with amphoteric protein and reacting with amphoteric metal. No. 418,975. Eric Berkeley Higgins.

Packing ring for effecting fluid tight seal. No. 418,988. John Henry Onions between two sliding members.

Hard, flexible, tough, adherent coating for metals consisting of acid-reacting vinyl resin heat treated in place with higher polyalkylene glycol. No. 419,017. Carbide and Carbon Chemicals Ltd. (Wm. N. Stoops).

Process of continuously manufacturing a dilute suspension of amylaceous material in water. No. 419,025. The Distillers Co. Ltd. (Philip Dalton Coppock).

Method of cathode ray tube scanning.. No. 419,031. Ferranti Ltd. (J. C. Wilson).

Thermostatic control device. No. 419,050. Landis & Gyr A.-G. (Robt. Amsler).

Process and apparatus for the production of magnesium hydroxide by precipitation from liquids containing convertible magnesium salts. No. 419,062. Ocean Salts (Products) Ltd. (Francis Norman Pickett).

Method of producing a pre-gelatinized starchy polysaccharide. No. 419,074. Stein, Hall Manufacturing Co. (Hans F. Bauer).

Process to extract aluminum from ores, together with at least one impurity of silicon, iron, titanium group, by alloying with zinc, tin, or mercury, and temperature separation. No. 419,093. Hirsch Loevenstein, Israel Foundaminsky.

Production of azo dye by coupling diazotized amino azo compound with mono-acidyl-meta-phenylen-ediamine in par position. No. 419,095. Henry Dreyfus (G. H. Ellis, H. C. Olpin, J. Wright).

Preparation of azo dye by coupling 4 nitro-4'-amino-3'-methoxy-6'-acetylamino-azo-benzene with a dialkyl aniline. No. 419,096. Henry Dreyfus (G. H. Ellis, H. C. Olpin, J. Wright).

Production of selenoazolidone by inter reaction of selenglycolic acid and phenyl mustard oil in alcoholic aqueous solution cntaining hydrchloric acid. No. 419,098. Adolf Sieglitz, Paul Heimke.

Granted and Published March 21, 1944.

Sedative containing as essential ingredient brominated blood. No. 419,108. Edgar A. Ferguson.

Diazine derivative. No. 419,145. Canadian General Electric Co. Ltd. (G. F. D'Alelio).

Triazine derivative. No. 419,146. Canadian General Electric Co. Ltd. (G. F. D'Alelio).

Impregnation of wood with resin forming composition such as hexamethylene-tetramine and phenol, prior to compression and heat treatment. No. 419,196. Jicwood Ltd. (R. L. J. Farina).

Capsule container design. No. 419,199. Major Paper Box and Wire Works Ltd. (Norman Bethel).

Vacuum type electromagnetic relay. No. 419,234. C. Lorenz Aktiengesellschaft (Hans F. Schwartz, Otto Baier).

Recovery of pulp liquor residue phenolic by products by liquor evaporation and destructive distillation of dried solids. No. 419,236. Edw. G. Goodell.

Method of producing low carbon ferro chrome. No. 419,240. Bo Mikael Sture Kalling, Ivar Rennerfelt.

Granted and Published March 28, 1944.

Hydraulic press method of charging rockets. No. 419,241. Conrad David Schermuly, Alfred James Schermuly, Chas. Schermuly.

Salt dispensing container with incorporated agitator. No. 419,247. Michael Bodnaruk.

Preparation of cellulose derivative containing nitrogen from cellulose aryl sulphonyl compound and alipathic nitrogen compound. No. 419,251. Henry Dreyfus.

Discharge device cathode. No. 419,297. Canadian General Electric Co. Ltd. (Marcello Pirani).

Sulphamylarylamino triazine. No. 419,301. Canadian General Electric Co. Ltd. (G. F. D'Alelio).

Organic water repellent. No. 419,312. Ellis-Foster Co. (J. B. Rust).

Ceramic product made by firing beryllium oxide, aluminum oxide, and silicon dioxide mixture. No. 419,315. General Motors Corp. (T. G. McDougal, K. Schwartzwalder, A. H. Fessler).

Tetile water repellent process employing water soluble quaternary ammonium compound of methyl halogen ether of higher fatty alcohol and subsequent heating. No. 419,318. Herberlein Patent Corp. (Ernst Waltmann).

Amino derivative prepared by reaction of anhydrous zirconium chloride with anhydrous amine in anhydrous solvent. No. 419,352. Titanium Alloy Mfg. Co. (Eugene Wainer).

Textile wear-resistance improvement by impregnation with acrylate or methacrylate ester. No. 419,365. Harry Corteen & Tootal Broadhurst Lee Co. Ltd. (A. E. Battye, Harry Corteen).

Granted and Published week of Apr. 4, 1944

Electric battery with magnesium cathode, fused cuprous chloride anode, and liquid body of magnesium sulphate, water, and fused magnesium chloride bridging cathode and anode. No. 419,370. Bert N. Adams.

Fuel economizing device for internal combustion engines. No. 419,374. Charente Pierre Reenen de Villiers.

Hollow plastic body moulding machine design. No. 419,381. Gustav Rudolf Kelm.

Railway car seal. No. 419,382. Alexander S. Mackay.

Method of manufacturing multi-ply sheets of paper by soaking compo-

nents with liquid containing asphalt and a chlorinated hydrocarbon solvent and evaporating solvent from the sheets by means of a current of gas. No. 419,385. Carl Georg Munters.

Production of sodium ferricyanide solution free from colour bodies by chlorinating sodium ferrocyanide solution with pH maintained between 7 and 9.5. No. 419,400. American Cyanamid Co. (Robt. B. Barnes, G. P. Ham).

Process for preparing stable, organic solvent free, aqueous dispersions of of Polythenes, derivatives, and ethylene interpolymers. No. 419,413. Candian Industries Ltd. (Albert Stanley Gomm).

Polymerizable composition comprising methyl methacrylate and inhibitor such as tannic acid, piperidine, resorcinol, or hydroquinone to retard polymerization four fold at about 100 degrees Cent. No. 419,444. Canadian Industries Ltd. (Imperial Chemical Industries Ltd., F. T. Hamblin, L. Wm. Codd).

Process for the production of fertilizer which comprises incorporating with an acidic fertilizer material a nitrifying solution obtainable by mixing water, formaldehyde, urea, and free ammonia. No. 419,415. Canadian Industries Ltd. (Frank Gilbert Keenen).

Synthetic linear polyamide plasticized with an alkylaryl sulphonamide. No. 419,416. Canadian Industries Ltd. (Gordon T. Vaala).

Process for the manufacture of condensation products by reacting, in presence of an acid, ethanthiol with N-methylollauramide. No. 419,-417. Canadian Industries Ltd. (P. R. Austin, Chas. E. Frank).

Stable, cement composition consisting of an equimolar mixture only of finely divided dry alkaline calcium compound, such as calcium oxide, hydroxide, or carbonate, and mono or dihydrated ferrous sulphate. No. 419,421. Canadian Industries Ltd. (Howard Raymond Wilson).

Textile processing composition and method of manufacture composed essentially of stable aqueous dispersion of polymerized butyl methacrylate. No. 419,426. Canadian Industries Ltd. (Jos. E. Smith).

Method of producing cold-swelling preparations from blanc mange or pudding-forming starch by treating starch about 73 degrees Cent. and 100 degrees Cent. for conversion into paste and subsequent drying. No. 419,439. Dryfoot Ltd. (August Adolph Salzburg).

New organic ammonium compounds useful as water repellents formed by reaction of halogenomethyl compound with aliphatic or heterocyclic tertiary amine. No. 419,445. Imperial Chemical Industries Ltd. (M. A. T. Rogers).

Acetylene generation apparatus wherein a charge of calcium carbide and water is continuously moved in a horizontal path through a generating zone and acetylene and relatively dry calcium hydrate may be recovered. No. 419,467. Shawinigan Chemicals Ltd. (Andrew Clifford Holm, Eddie Poirier).

An apparatus for sorting, dehydrating, or washing, suspensions of fibrous material. No. 419,483. AB. A. Ekstroms Maskinaffar and Nils Walfrid Jonsson (Karl Olof Lindgren).

A refractory comprising a mixture of a material rich in magnesium orthosilicate and Portland cement. No. 419,486. Victor Moritz Goldschmidt.

Colouration of cellulose acetate textiles by impregnation with amino-azo compound obtainable by coupling diazotized mono-acetylbenzidine with a p-coupling primary amine of the benzene series, diazotizing the amino-azo compound on the textile, and coupling the diazo with a hydroxy-diphenyl. No. 419,489. Henry Dreyfus (Ed. Stanly, G. H. Ellis, H. C. Olpin).

Granted and Published Apr. 11, 1944

Product obtained by combining acetylsalicylic acid with a calcium glutamate. No. 419,495. Clemmy O. Miller, Arthur E. Siehrs.

Automatic electric regulator. No. 419,499. Neville Ryland Davis, Jas. N. Wetherilt.

Design for dish or bottle washing apparatus. No. 419,518. Aktiebolaget Elektrolux (Johan Fredrik Robert Karlstrom).

Shoe tread composed essentially of layers of vinyl resin, chlorinated rubber, and leather. No. 419,528. B. B. Chemical Co. of Canada Ltd. (Fred V. Nugent).

Shoe tread composed essentially of layers of vinyl resin, copolymer of butadiene and acrylonitrile, and leather. No. 419,529. B. B. Chemical Co. of Canada Ltd. (Fred V. Nugent).

Thermoplastic, oil soluble resin, produced by reaction of monomeric styrene with oil-soluble phenol-aldehyde. No. 419,530. Bakelite Corp. of Canada Ltd. (Ralph G. Fulton, Leo R. Whiting).

Discharge light wherein luminescent material is cadmium phosphate with manganese activator, with phosphoric acid employed as binder. No. No. 419,532. Canadian General Electric Co. Ltd. (John Turton Randall).

Electric lamp design, employing helium, hydrogen atmosphere and rare gas and rare, volatilizable metal inclusion. No. 419,533. Canadian General Electric Co. Ltd. (Martin Reger).

Coil checking apparatus. No. 419,534. Canadian General Electric Co. Ltd. (Gordon C. Tollington).

Protective coating for rubber surfaces comprising a pigment, dead-milled rubber, and reaction product of rubber and halogenated acid of tin. No. 419,535. Canadian General Electric Co. Ltd. (Geo. Francis Rishor).

Shatter-resisting flash bulb with inner bulb coating of polyvinyl acetate. No. 419,546. Carbide and Carbon Chemicals Ltd. (Carl W. Patton).

Electron discharge device. No. 419,554. Electric and Musical Industries Ltd. (James Dwyer McGee).

Cathode ray tube design. No. 419,558. Electric and Musical Industries Ltd. (Leonard Francis Broadway).

Method of obtaining independent colour separation photographic records from each of two colour-sensitized emulsion layers inseparably superposed. No. 419,568. Harry Edward Coote.

Method of preparing a stable silica organo-aquasol composed of colloidal silica, isopropyl alcohol and water. No. 419,576. Monsanto Chemical Co. (Morris D. Marshall).

Method of manufacturing an insulated power cable. No. 419,581. Northern Electric Co. Ltd. (T. R. Scott, J. K. Webb, J. F. Morley).

Refining sugar solution by bleaching and filtering through activated bauxite. No. 419,589. Porocel Corporation (Wm. A. La Lande Jr.).

Apparatus for the production of hydrogen by steam-iron process. No. 419,590. The Power Gas Corporation Ltd. (Niels Edw. Rambush, Arthur T. Grisenthwaite).

A multi-pole electric coupling design. No. 419,592. Pye Ltd. (Jas. W. Dalgleish).

Process for the manufacture of nuclear ketones of the cyclopentanopolyhydrophenanthrene series. No. 419,599. Society of Chemical Industry in Basle (Leopold Ruzicka).

Reducing corrosion of ferrous metals by ammonium nitrate containing free ammonia by means of thiocyanate inclusion. No. 419,600. The Solvay Process Co. (Herman A. Beekhuis Jr., Wm. De Forest).

Plastic dental impression material comprising 30 to 65 per cent of a condensation resin obtained from naphthalene and formaldehyde. No. 419,627. Winthrop Chemical Co., Inc. (Walter Moosdorf).

Apparatus for handling and conveying minerals. No. 419,630. Matthew Smith Moore and The Mining Engineering Co. Ltd.

Production of pulp suitable for manufacture of white paper from unbarked wood by super atmospheric pressure cooking in caustic soda solution. No. 419,632. Thomas Linsey Crossley, Richard Joseah Hart, Margaret Evelyn Petersen.

Granted and Published Apr. 18, 1944

Purification of aqueous, alkaline manganese solution, for electrolytic deposition of manganese therefrom, by oxidation removal of iron and arsenic, and soluble xanthate elimination of cobalt and nickel. No. 419,639. Frederick William Atack.

New article of manufacture, comprising a metallic article electroplated with manganese containing less than 0.02 of sulphur as sulphide. No. 419,640. Frederick William Atack.

Sintered, powdered metal dies, adaptable for use in the manufacture of fibrous pulp articles. No. 419,641. Harold Holmyard Beasley.

Cooling apparatus design for internal combustion engine. No. 419,643. Gordon Patrick Bradley.

Fish fillet canning process. No. 419,646. Emile Derible.

Adjustable stop for lathes. No. 419,650. Harry Howard Freeman.

Wire gauze coated with artificial resin adapted for glaze proof ironing of textiles. No. 419,652. Otto Knecht.

Hand operated liquid atomizing apparatus. No. 419,663. Vernon Anthony Trier.

Liquid-conveying tubular condenser design. No. 419,665. Francis Clarence Walter Wilkinson.

Continuous process for separation of non-acetylenic hydrocarbon having two carbon atoms to the molecule from gaseous mixtures containing methane. No. 419,682. Carbide and Carbon Chemicals Ltd. (Geo. T. Felbeck).

Liquid level gauge for container holding a volatile liquid having normal boiling point below atmospheric pressure. No. 419,690. Dominion Oxygen Co., Ltd. (George H. Zenner).

Continuous process for concentrating, purifying and separating the disperse phase of colloidal dispersions by means of an electric field. No. 419,692. Dunlop Plantations Ltd. (Wolfgang Pauli).

Process for preparing highly light reflective and corrosion resistant nickel-based coatings. No. 419,697. The International Nickel Co. of Canada Ltd. (E. M. Wise, R. F. Vines).

Corrosion resistance improvement of magnesium and magnesium alloys by subjecting to steam-oxygen mixture at elevated temperature. No. 419,-703. Magnesium Elektron Ltd. (Frank Arthur Allen, Jack Morgan).

Metal tubing bending method by means of flexible and resilient mandrel. No. 419,710. Morris Motors Ltd. (George Edward Dono, Ronald Harbridge Goddard).

Granted and Published Apr. 25, 1944

Machine tool slide. No. 419,761. Leo Caspar Steinle, Cedric Harold Hanwell.

Exposure meter design for reflex camera. No. 419,764. Jacques Bolsey.

Variable speed epicyclic gearing. No. 419,766. Edgar Joseph de Normanville.

Multitubular boiler. No. 419,775. J. Emile Legault.

Pocket igniter made in two parts of plastic material capable of being united in the cold by a solvent. No. 419,777. Norman Henry Rosedale.

Portable pump unit design. No. 419,778. Claude Sydney Thicke.

Stereoscopic projection system. No. 419,780. Edwin Herbert Wright.

Method of coating interior surface of glass envelope of electric discharge device with fluorescent material employing incorporation of boric acid in cellulosic ester suspension of fluorescent material. No. 419,788. Canadian General Electric Co. Ltd. (Willard A. Roberts, Hannah T. Geissbuhler).

Manufacture of caprolactam by catalytic dehydration of a cyclohexanone oxime and ammonia admixture. No. 419,799. Canadian Industries Ltd. (Wilbur Arthur Lazier, George Rigby).

Production of polyamides from cyclic amides. No. 419,800. Canadian Industries Ltd. (Wm. Edward Hanford).

Method of manufacturing furyl vinyl and furyl isopropenyl ketone compound. No. 419,801. Canadian Industries Ltd. (Carl E. Barnes).

Process for production of omega-amino aliphatic nitriles. No. 419,803. Canadian Industries Ltd. (Geo. Wayne Rigby).

Preparation of moulding compound by polymerizing together 100 parts of methyl methacrylate and 5-25 parts of compound from group of styrene, vinyl acetate, and methyl acrylate. No. 419,805. Canadian Industries Ltd. (Maurice Leon Macht, David Adams Fletcher).

Continuous process for the manufacture of acetonitrile by dehydration of the aqueous acetonitrile by feeding to the still column both the aqueous acetonitrile and a hydrocarbon boiling between 60° and 145° Cent. No. 419,806. Canadian Industries Ltd. (Henry Reginald Clive Pratt).

Apparatus for introducing air or other gases in a finely divided state into a liquid. No. 419,834. Electro-Chemical Engineering Co. Ltd. (Allan Robert Gibson).

Process for the production of halogenated polythenes of improved physical and mechanical properties which comprises mixing at least two halogenated polythenes of different halogen content, whose halogen contents do not differ by more than 12 per cent, until a homogeneous mixture is obtained. No. 419,848. Imperial Chemical Industries Ltd (James Robertson Myles, Francis Stephen Bridson-Jones).

Process for manufacture of diesel fuel and knock stable gasoline by catalytic hydrogenation of a middle oil. No. 419,851. International Hydrogen Patents Co. (Mathias Pier, Ernst Donath).

Method of improving the yield point of cast magnesium alloys containing 7 to 12 percent aluminum; 0.2 to 4.0 per cent zinc; 0.1 to 1.0 manganese; with total alloying constituents not above 12 percent, by heat treating such alloys in "ast cast" condition at 100 to 250 degrees Cent. No. 419,857. Magnesium Metal Corp. Ltd. (Alfred Brandt).

Method of treating cellulosic textiles to remove impurities and surface hairs by means of copper sulfate. No. 419,863. Ridbo Laboratories, Inc. (Eric Owen Ridgeway).

Process for the manufacture of chromane compounds. No. 419,895. I. G. Farbenindustrie Aktiengesellschaft (Robert Behnisch).

Granted and Published May 2, 1944

Device for vacuumizing containers. No. 419,902. Herbert Brand.

Druggist's cabinet design. No. 419,907. Herbert Joseph Hauser.

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

407,853. No. Flame Chemical Corp., Los Angeles, Calif.; filed Jan. 29, 1944; serial No. 467,004; for impregnating materials, for fire extinguisher; since Mar. 1, 1943.

450,694. W. H. Plunkett, as Plunkett Chemical Co., Chicago, Ill.; filed Feb. 3, 1942; for insecticide; since June 1, 1920.

458,339. Reichhold Chemicals, Inc., Detroit, Mich.; filed Feb. 4, 1943; for plastic resins; since Dec. 12, 1942.

460,735. Fidelity Chemical Products Corp., Newark, N. J.; filed May 19, 1943; for cleaning composition; since Mar. 29, 1943.

460,772. Harold J. Searer, Akron Linen Products Co., Akron, O.; filed May 20, 1943; for synthetic rubber; since May 1, 1942.

462,166. Imperial Chemical Industries, London, England; filed July 19, 1943; for polythene; since Feb. 1, 1942.

463,655. Phelan-Faust Paint Mfg. Co., St. Louis, Mo.; filed Sept. 25, 1943; for control of termites; since July 1943.

464,450. Standard Oil Co. of N. J., Wilmington, Del.; filed Oct. 27, 1943; for petrolatum; since Aug. 27, 1943.

464,451. Standard Oil Co. of N. J., Wilmington, Del.; filed Oct. 27, 1943; for leather oil; since Aug. 27, 1943.

464,452. Standard Oil Co. of N. J., Wilmington, Del.; filed Oct. 27, 1943; for polishing oil; since Aug. 27, 1943.

464,453. Standard Oil Co. of N. J., Wilmington, Del.; filed Oct. 27, 1943; for ink oil; since Aug. 27, 1943.

464,840. Wyandotte Chemicals Corp., Wyandotte, Mich.; filed Nov. 8, 1942; for detergent material; since Aug. 3, 1939.

464,842. Wyandotte Chemicals Corp., Wyandotte, Mich.; filed Nov. 8, 1943; for detergent material; since May 31, 1939.

464,844. Wyandotte Chemicals Corp., Wyandotte, Mich.; filed Nov. 8, 1943; for cleansing materials; since July 21, 1938.

467,411. Stauffer Chemical Co., San Francisco, Calif.; filed Feb. 14, 1944; for chemicals; since 1894.

467,746. Attapulgus Clay Co., Wilmington, Del., and Phila., Pa.; filed Feb. 25, 1944; for adsorbent materials; since Dec. 23, 1943.

467,759. Kinetic Chemicals, Inc., Wilmington, Del.; filed Feb. 25, 1944; for monochlorodifluoromethane; since Jan. 14, 1944.

467,861. Quaker Chemical Prods. Corp., Conshohocken, Pa.; filed Feb. 29, 1944; for cleansing and wetting materials; since November 1939.

467,938. The Egyptian Lacquer Mfg. Co., N. Y.; filed Mar. 3, 1944; for lacquers; since Apr. 29, 1943.

468,246. The Firestone Tire & Rubber Co., Akron, Ohio; filed Mar. 13, 1944; for paints; since Feb. 4, 1944.

468,249, 250. The Firestone Tire & Rubber Co. as Firestone Industrial Products Co., Akron, Ohio; filed Mar. 13, 1944; for adhesives; since Feb. 4, 1944.

468,288, 292. Industrial Raw Materials Corp., N. Y.; filed Mar. 14, 1944; for wax; since Dec. 11, 1943.

468,377. The De Pree Co., Holland, Mich.; filed Mar. 17, 1944; for insecticide; since June 5, 1922.

468,587. American Chemical Paint Co., Ambler, Pa.; filed Mar. 24, 1944; for metal stripping composition; since Feb. 29, 1944.

468,640. Ferd Staffel Co., San Antonio, Tex.; filed Mar. 24, 1944; for insecticide; since Dec. 20, 1944.

468,665. Defiance Machine Works, Inc., Toledo, Ohio; filed Mar. 25, 1944; for plastics processing machines; since Jan. 10, 1944.

468,789. Garco Products, Inc., Conoquenessing, Pa.; filed Mar. 29, 1944; for mixture of silica and glass; since May 11, 1939.

468,807, 808, 810. Nuodex Products Co., Inc., Elizabeth, N. J.; filed Mar. 29, 1944; for metallic salts and soaps; since 1924.

468,839. Grant Photo Products, Inc., N. Y.; filed Mar. 30, 1944; for photographic paper; since July 1921.

468,886. Great Lakes Varnish Works, Inc., Chicago, Ill.; filed Mar. 31, 1944; for varnish; since Mar. 28, 1944.

468,889. The Kelley Island Lime and Transport Company, Cleveland, O.; filed Mar. 31, 1944; for lime; since Mar. 17, 1944.

468,951, 952. Central Chemical Corp., Everett, Pa., and Hagerstown, Md.; filed Apr. 3, 1944; for insecticide, fungicide; since May 1937.

469,050. Spencer Kellogg and Sons, Inc., Buffalo, N. Y.; filed Apr. 5, 1944; for drying oil, since January 1944.

469,102. The American Products Co., Inc., Kansas City, Kans.; filed Apr. 7, 1944; for waterproofing composition; since Jan. 31, 1944.

469,148. The Chemical Corp., Springfield, Mass.; filed Apr. 8, 1944; for electrolytic stripping baths; since Apr. 8, 1940.

469,174. The Tremco Mfg. Co., Cleveland, O.; filed Apr. 8, 1944; for paint; since Sept. 11, 1942.

407,643. Van Dusen Aircraft Supplies, Inc., Minneapolis, Minn.; filed Nov. 6, 1943; serial No. 464,801; for lacquers; since Apr. 1, 1941.

469,192. The Dow Chemical Co.; Midland, Mich.; filed Apr. 10, 1944; for artificial fibers; since July 8, 1943.

469,214. Silver Seal Products of Okla., Inc., Barnsdall, Okla.; filed Apr. 10, 1944; for sodium hypochlorite; since Nov. 24, 1943.

469,355. Ben F. Doke as Mir-O-Col Alloy Co., Los Angeles, Calif.; filed Apr. 15, 1944; for welding rod; since May 1, 1937.

469,369. Sylvania Industrial Corp., Fredericksburgh, Va., and N. Y.; filed Apr. 15, 1944; for compounds for textiles, papers; since Mar. 31, 1944.

469,395. General Dyestuff Corp., N. Y.; filed Apr. 17, 1944; for dyes; since Oct. 28, 1920.

469,615. Sinclair Refining Co., N. Y.; filed Apr. 24, 1944; for quenching oils; since Jan. 11, 1943.

469,704. Sinclair Refining Co., N. Y.; filed Apr. 26, 1944; for cutting oils; since Apr. 27, 1943.

469,806. Corn Products Refining Co., N. Y.; filed Apr. 29, 1944; for protein material; since Mar. 10, 1944.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, June 13 to July 4, 1944.

407,853

B. W. C.
464,840

VELOWELD
468,250

468,665

MAG-SPRAY
468,889

POLYFIBRE
469,192

ROCH-NO
450,694

F-100
464,842

INDRALATUM
468,288

PRO-TEX
468,951

LINE-X
469,214

FIDELITY
ABSORBO
460,735

S. I. FLAKES
464,844

VELATRUM
468,292

CARTEX
468,789

SOYTEX
468,952

MIR-O-COL
469,355

Chemiflex
460,772

Stauffer
467,411

PLYOPHEN
458,339

NUODEX
468,807

KELAPOL
469,050

SYLSIZE
469,369

ALKATHENE
462,166

CIBOH
467,746

PIED PIPER

468,377

NUODITE
468,808

PLY-LAS-TIC
469,102

KATANOL
469,395

KEMA* TOX
463,655

DIANOL
467,861

468,810

STRIPODE
469,148

QUENCHOL
469,615

W.S.
464,450

PEBBLE-TEX
467,938

ACTALYTE
468,587

TREM-ENAMEL
469,174

CARNITE
469,704

W.S.
464,451

VELOID
468,246

468,640

Posiprint
468,839

Van Dusen
407,643

W.S.
464,453

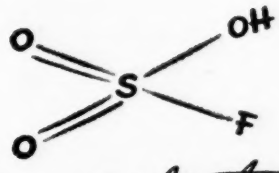
VELOGEL
468,249

Plastic-Var
468,886

COPREIN
469,806

Here's A NEW CHEMICAL TOOL BY GENERAL···

FLUOSULFONIC ACID



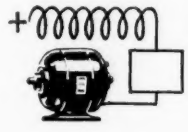
Potential Industrial Applications

In preparation of Sulfamido Acids · Boron Trifluoride
Aromatic Sulfonyl Fluorides · Sulfuryl Fluoride · Alkyl
Fluosulfonates · Acyl Fluorides · Aryl Fluosulfonates
Other Alkyl Reactions.

Physical Properties

Mobile, nearly colorless liquid which fumes in damp air.
Boils at 330° F. (165.5° C.) under 760 mm Hg pressure.
Freezes at –125° F. (–87.3 C.)
Specific Gravity: 1.743 at 60° F. (15.6° C.)
Vapor pressure: 3 mm Hg at 80° F. (26.7° C.)
Specific Electrical Resistance: 205 ohms per cubic cm at 86° F. (30° C.)
Viscosity: 1.7 centipoises at 68° F. (20° C.)
Heat of Formation from SO_3 (l) and HF (g): 25 kilocalories per mole.
Most salts soluble in water.

ME FUTURE USES OF HSO_3F ($HO{\cdot}SO_2F$)

lkylating agent in anufacture of high ctane fuel for the post-ar "plane-mobile."	
eagent in the pro-uction of synthetic olymers with dielec-ric properties.	
n manufacture of dye ntermediates.	
n producing high ressure lubricants, utting oils, etc.	
n other research and manufacture involving rganic or inorganic hemicals.	

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Acid Hydrofluoric, Aqueous
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Ammonium Bifluoride
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Barium Fluoride
Boron Trifluoride
Chromium Fluoride
Cupric Fluoride
Fluoride Fluxes
Lead Fluoride
Lithium Fluoride
Magnesium Fluoride
Nickel Fluoride
Polyacid Fluorides (e.g. KF. x HF)
Potassium Fluoride, Anhydrous
Potassium Fluoride, Crystal
Sodium Bifluoride
Sodium Fluoride
Strontium Fluoride

Fluoborates

Acid Fluoboric
Ammonium Fluoborate
Cadmium Fluoborate
Chromium Fluoborate
Copper Fluoborate
Ferrous Fluoborate
Indium Fluoborate
Lead Fluoborate
Nickel Fluoborate
Potassium Fluoborate
Silver Fluoborate
Sodium Fluoborate
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Fluosulfonates

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